

PUBLIC WORKS NOTES:

- 1. All requirements relative to City Code and Public Works Design and Construction Standards shall be submitted and approved before release of site plans.
- 2. All required bonds, escrows, insurances, cash, etc., shall be submitted and approved before release of site plans.
- 3. Plan and profile shall be submitted (inked on mylar size 24" x 36") for all storm sewers and street projects in public right-of-ways or public easements and approved before release of site plans.
- 4. Contractor is responsible to notify all utility companies before construction begins.
- 5. All datum shall be based on USC and GS datum.
- 6. Bonds shall not be released until the receipt and approval by the City of as-built site plan, plans and profiles, etc.
- 7. All underground utilities and transformers shall be shown on site plan and confirmed per location on as-built plan.
- 8. The owner shall notify the Director of Public Works in Writing three days prior to the beginning of all street or storm sewer work shown on the site plan.
- 9. The installation of improvements as required in this article shall in no case serve to bind the city to accept such improvements for the maintenance, repair of operation thereof, but such acceptance, shall be subject to the existing regulations concerning the acceptance of each type of improvement.
- 10. No lane closures are permitted on West Broad Street before 9:30 AM and after 3:00 PM. Only one lane may be closed at a time. VDOT requirements for traffic control will govern.
- 11. Normal construction hours are 7:00 AM to 9:00 PM Monday, through Friday and 9:00 AM to 9:00 PM on weekends and holidays.
- 12. Permits are required for construction work located within the established City right-of-way.

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FIRE MARSHAL NOTES:

- All requirements relative to City Fire Code and Virginia Building Code must be complied with.
- 1. Use group classification R-2 FOR COMMON HOUSE; HOMES GOVERNED BY IRC
 - 2. Type of construction VB
 - 3. Fire flow @ hydrant. Q20 = 2100 GPM HYDRANT #40-3-99 (SEE SHEET C-0401 FOR LOCATION)
- NOTE: NFPA-13D SPRINKLER PACKAGE PROPOSED

PUBLIC UTILITIES NOTES:

FAIRFAX WATER
WATER MAIN CONSTRUCTION NOTES

- 1. ALL WATER MAIN CONSTRUCTION, TESTING AND SAMPLING SHALL COMPLY WITH THE REQUIREMENTS AND SPECIFICATIONS OF FAIRFAX WATER'S CONSTRUCTION PRACTICE MANUAL AND THE REQUIREMENTS OF THE FAIRFAX COUNTY PUBLIC FACILITIES MANUAL. ALL WATER MAIN, FITTINGS AND APPURTENANCES SHALL COMPLY WITH FAIRFAX WATER'S "APPROVED PRODUCTS LIST". THE CONSTRUCTION PRACTICE MANUAL AND APPROVED PRODUCTS LIST MAY BE FOUND ON THE FW WEBSITE AT WWW.FAIRFAXWATER.ORG.
- 2. THE DEVELOPER SHALL REQUEST INSPECTION BY FAIRFAX WATER THREE DAYS PRIOR TO COMMENCING CONSTRUCTION OF THE WATER MAIN (PHONE NUMBER 703-289-6388 OR 6389).
- 3. NO WATER MAIN CONSTRUCTION IS PERMITTED OR VALVES OPERATED WITHOUT PRIOR NOTIFICATION OF FAIRFAX WATER (PHONE NUMBER 703-289-6388 OR 6389).
- 4. MAXIMUM WORKING PRESSURE SHALL BE 50 PSI.
- 5. THE DEVELOPER WILL BE RESPONSIBLE FOR ANY RELOCATION OR REMOVAL OF WATER MAINS AND APPURTENANCES DUE TO THE DEVELOPMENT OF THIS PROPERTY. SERVICE LINES WHICH WILL NO LONGER BE USED SHALL BE REMOVED AND DISCONNECTED AT THE WATER MAIN BY THE DEVELOPER, AND THE CORPORATION STOP SHUT-OFF AND CAPPED, OR REMOVED AND PLUGGED (WITH A TAPERED PLUG) AS DIRECTED BY THE FAIRFAX WATER INSPECTOR. THE DEVELOPER MAY ALSO BE REQUIRED TO USE ADDITIONAL PIPE RESTRAINT OR ALTERNATIVE CONSTRUCTION METHODS NOT SHOWN ON THE PLANS IF FIELD CONDITIONS WARRANT, AS DETERMINED BY THE FAIRFAX WATER INSPECTOR.
- 6. ALL NEW AND EXISTING VALVE BOXES MUST BE FULLY ADJUSTED TO CONFORM TO THE FINAL ASPHALT GRADE. NO PAVING ADJUSTERS WILL BE PERMITTED.
- 7. ALL NEW D.I.P. WATER MAIN SHALL BE WRAPPED WITH 4 MILLIMETER CROSS-LAMINATED POLYETHYLENE ENCASEMENT (SINGLE WRAPPED - LESS THAN 24"; DOUBLE WRAPPED - 24" AND LARGER). THERE SHALL BE A 6 INCH ENVELOPE OF 21A SELECT FILL FOR ALL POLYETHYLENE WRAPPED WATER MAIN. SEE THE TRENCH DETAILS ON THE CURRENT VERSION OF FW STANDARD DETAILS. THESE DETAILS MAY BE FOUND ON THE FW WEBSITE AT WWW.FAIRFAXWATER.ORG.
- 8. WHEN CONNECTING TO AN EXISTING WATER MAIN, CONTRACTOR MUST EXCAVATE AND EXPOSE NEAREST VALVE IN THE PRESENCE OF A FAIRFAX WATER INSPECTOR IN ORDER TO DETERMINE THE CONDITION OF ITS RESTRAINT. IF FW INSPECTOR DEEMS IT NECESSARY, CONTRACTOR MUST RESTRAIN THE VALVE OR REPLACE THE RESTRAINT SYSTEM.
- 9. DURING WET TAP INSTALLATIONS THE CONTRACTOR SHALL SAVE AND TAG THE COUPON CLEARLY SHOWING THE DATE, LOCATION, DIAMETER AND PIPE MATERIAL. THE TAGGED COUPON SHALL BE GIVEN TO FAIRFAX WATER'S INSPECTOR FOR FURTHER PROCESSING. IF ANY PIPE IS TO BE ABANDONED, PRIOR TO CAPPING THE MAIN, A SMALL SECTION OF PIPE SHALL BE REMOVED, TAGGED AS DESCRIBED ABOVE AND GIVEN TO THE FAIRFAX WATER INSPECTOR.
- 10. FIRE LINES SHALL BE PRIVATELY OWNED AND MAINTAINED BY THE PROPERTY OWNER. FAIRFAX WATER'S OWNERSHIP AND MAINTENANCE RESPONSIBILITY INCLUDES AND STOPS AT THE BRANCH VALVE AT FAIRFAX WATER'S MAIN IN THE RIGHT-OF-WAY OR EASEMENT.
- 11. USE Q20 = 2100 GPM

PLANNING NOTES:

SPECIAL EXCEPTION:

A SPECIAL EXCEPTION FOR COTTAGE HOUSING DEVELOPMENT IN AN R-1A DISTRICT APPROVED BY CITY COUNCIL ON SEPTEMBER 11, 2017 INCLUDING THE FOLLOWING MODIFICATION:

*A MODIFICATION TO SECTION 48-241(A)(14)(A) IS HEREBY APPROVED, TO REDUCE THE 20 FOOT BUFFER FROM A PUBLIC RIGHT OF WAY TO TWELVE FEET TO ALLOW FOR EIGHT-FOOT WIDE EASEMENT ON THE SUBJECT PROPERTY ALONG THE SOUTHERN EDGE OF RAILROAD AVENUE, WHICH SHALL BE GRANTED PRIOR TO SITE PLAN APPROVAL, AND WHICH SHALL BE USED FOR OVERFLOW PARKING, OR UPON ORDER OF THE FIRE MARSHALL, FOR PERMANENT PUBLIC SAFETY VEHICLE ACCESS."

SEE VOLUNTARY CONCESSIONS ON SHEET C-0203.

ARBORIST NOTES:

RPI MAP INFORMATION:

RPC 52-102-032, 52-102-031, 52-102-030

Lot(s) 4, 4A, 5 Block LUCINDA GASKINS PARTITION

MISCELLANEOUS NOTES:

- 1. Upon satisfactory completion of the installation of required improvements, as shown on the approved site plan or a section thereof, the developer shall submit to the Department of Planning five copies of an as-built site plan certified by the engineer, architect and/or surveyor for approval for conformity with the approved site plan.
- 2. The As-Built Site Plan shall be submitted and approved prior to the issuance of the final Occupancy Permit.
- 3. Final approval by the Planning Commission of this site plan shall expire one year after the day of such approval if building permits have not been obtained for construction in accordance therewith, unless an extension is granted by the City.
- 4. In any development involving a condominium, cooperative, automatic owners' association or other form of ownership in which there is common area within the development, the documents pertaining to this form of ownership shall be approved by the City Attorney prior to issuance of any Occupancy Permit.
- 5. Any proposed changes or revisions during the execution of or subsequent to implementation of the approved site plan shall be subject to City review and approval.
- 6. The federal emergency management agency's flood insurance rate map for the City of Falls Church, Virginia, map number 5100540001c, revised date July 16, 2004, designates the property as being in zone x, "Areas determined to be outside the 0.2% annual chance floodplain."

WAIVERS:

- 1. LANDSCAPE WAIVERS:
 - NORTHERN PROPERTY LINE 48-1183.2.a
 - ±232 LF 20" BUFFER TYPE A
 - REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET C-1204.
 - SOUTHERN PROPERTY LINE 48-1183.2.a
 - ±600 LF 10' BUFFER TYPE A
 - REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET C-1204.
 - WESTERN PROPERTY LINE 48-1183.2.a
 - ±185 LF 10' BUFFER TYPE A
 - REDUCE REQUIRED PLANTING DENSITY TO THAT SHOWN ON SHEET C-1204.
- MODIFICATION REQUEST FOR DECK WITHIN 10' SETBACK FOR UNIT 3 (1024 RAILROAD AVE.) AS SHOWN ON SHEET C-0401 PER SECTION 48-241(a)(14)c.

VARIANCE:

MISCELLANEOUS NOTES:

Easement(s):

- 1. VACATION EXISTING 10' SANITARY SEWER EASEMENT
- 2. PROPOSED 10' SANITARY SEWER EASEMENT
- 3. PROPOSED 10' STORM SEWER EASEMENT
- 4. PROPOSED COWA EASEMENT

Subdvision(s) and Consolidation(s):

CONSOLIDATION OF PARCELS 52-102-032, 52-102-031, 52-102-030

Dedication(s):

N/A

Site Plan Approval:

APPLICATION FOR REVIEW AND APPROVAL BY
CITY OF FALLS CHURCH, VIRGINIA



CONSTRUCTION NOTES

CONTRACTOR AND DEVELOPER ARE ADVISED THAT ANY ELECTRONIC FILES ASSOCIATED WITH THE PREPARATION OF THESE PLANS WILL NOT BE RELEASED TO OTHERS FOR USE IN CONSTRUCTION STAKEOUT OR RELATED SERVICES.

1. THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES BEFORE COMMENCING WORK AND FOR ANY DAMAGES WHICH MAY OCCUR BY HIS FAILURE TO LOCATE OR PRESERVE THESE UNDERGROUND UTILITIES. IF DURING CONSTRUCTION OPERATIONS THE CONTRACTOR SHOULD ENCOUNTER UTILITIES OTHER THAN IN THOSE SHOWN ON THE PLANS, HE SHALL IMMEDIATELY NOTIFY THE ENGINEER AND TAKE NECESSARY AND PROPER STEPS TO PROTECT THE FACILITY AND ASSURE THE CONTINUANCE OF SERVICE.

2. THE CONTRACTOR SHALL DIG TEST PITS AS REQUIRED FOLLOWING NOTIFICATION AND MARKING OF ALL EXISTING UTILITIES BY MISS UTILITY TO VERIFY THE LOCATION AND DEPTH OF EXISTING UTILITIES. TEST HOLES TO BE PERFORMED AT LEAST 30 DAYS PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES ARE TO BE REPORTED IMMEDIATELY TO THE OWNER AND ENGINEER. REDESIGN AND APPROVAL BY REVIEWING AGENCIES SHALL BE OBTAINED IF THIS INSTANCE OCCURS.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE OWNER AND THE ENGINEER OF ANY CHANGES OR CONDITIONS ATTACHED TO PERMITS OBTAINED FROM ANY AUTHORITY ISSUING PERMITS.

4. THE CONTRACTOR SHALL VISIT THE SITE AND SHALL VERIFY EXISTING CONDITIONS PRIOR TO STARTING CONSTRUCTION.

5. THE CONTRACTOR SHALL CLEAR THE SITE OF ALL TREES, BUILDINGS, FOUNDATIONS, ETC. WITHIN THE LIMITS OF CONSTRUCTION UNLESS OTHERWISE SPECIFIED, AND SHALL BE RESPONSIBLE FOR CAUSING EXISTING UTILITIES TO BE DISCONNECTED.

6. THE DEVELOPER SHALL PROVIDE OVER-LOT GRADING TO PROVIDE POSITIVE DRAINAGE AND PRECLUDE PONDING OF WATER.

7. FINISHED GRADES SHOWN FOR FINISHED TOP OF CURB GRADES ON EXISTING ROADS SHALL BE FIELD ADJUSTED AS REQUIRED TO CONFORM TO THE INTENT OF THE TYPICAL SECTION USING THE EXISTING EDGE OF PAVEMENT AS THE CONTROL POINT. A SMOOTH GRADE SHALL BE MAINTAINED FROM THE CENTERLINE OF THE EXISTING RIGHT-OF-WAY TO THE FACE OF CURB TO PRECLUDE THE FORMING OF FALSE GUTTERS AND/OR THE PONDING OF WATER ON THE ROADWAY. THE EXISTING PAVEMENT SHALL BE RECAPPED AND/OR REMOVED AND REPLACED AS REQUIRED TO ACCOMPLISH THIS REQUIREMENT. CURB FORMS SHALL BE INSPECTED AND APPROVED FOR HORIZONTAL AND VERTICAL ALIGNMENT BY CITY OF FALLS CHURCH INSPECTORS PRIOR TO PLACING OF CONCRETE. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR FINISHED GRADES ON TOP OF STRUCTURED PARKING DECK.

8. ALL AREAS, ON OR OFF-SITE, WHICH ARE DISTURBED BY THIS CONSTRUCTION AND WHICH ARE NOT PAVED OR BUILT UPON, SHALL BE ADEQUATELY STABILIZED TO CONTROL EROSION AND SEDIMENTATION. THE MINIMUM ACCEPTABLE STABILIZATION SHALL CONSIST OF PERMANENT GRASS, SEED MIXTURE TO BE AS RECOMMENDED BY THE CITY AGENT. ALL SLOPES 3:1 AND GREATER SHALL BE SODDED AND PEGGED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY CITY OF FALLS CHURCH.

9. EXISTING WELLS SHALL BE PERMANENTLY ABANDONED IN ACCORDANCE WITH VIRGINIA STATE WATER CONTROL BOARD REQUIREMENTS.

10. ALL OVER HEAD POLE LINES SHALL BE RELOCATED AS REQUIRED BY THE OWNING UTILITY COMPANIES AND AT THE DEVELOPERS EXPENSE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL ARRANGEMENTS AND COORDINATING ALL WORK REQUIRED FOR THE NECESSARY RELOCATIONS.

11. SUBBASE MATERIAL SHOWN ON THE TYPICAL STREET SECTION SHALL CONFORM TO VDOT SPECIFICATIONS SECTION 209. PAVEMENT THICKNESS AS SHOWN ON THE PLAN ARE BASED ON AN ASSUMED SOIL SUPPORT VALUES (S.S.V.) OF 10 UNLESS OTHERWISE NOTED. A QUALIFIED SOILS TESTING FIRM SHALL BE ENGAGED BY THE CONTRACTOR TO DETERMINE THE ACTUAL S.S.V. IN ACCORDANCE WITH "A DESIGN GUIDE FOR SUBDIVISION PAVEMENTS IN VIRGINIA" BY N.K. VASWANI, OCTOBER 1973, VHCRC 73-821 AS AMENDED. SOIL SUPPORT VALUES SHALL BE OBTAINED AT EACH CHANGE IN SUBGRADE SOILS AND AT A MAXIMUM SPACING OF 500 FEET WHERE SUBGRADE SOILS REMAIN CONSTANT. S.S.V. SHALL BE FURNISHED TO THE ENGINEER AND THE ENGINEER SHALL REVISE THE PAVEMENT DESIGN THICKNESS TO SHOW THE ACTUAL DEPTH OF PAVEMENT MATERIAL REQUIRED AND SHALL SUBMIT THE REVISION TO THE CITY OF FALLS CHURCH FOR REVIEW AND APPROVAL. THE CONTRACTOR IS ADVISED NOT TO BRING THE AREA SUBJECT TO THIS REVISION TO FINISHED GRADE UNTIL AFTER THE REVISED PAVEMENT SECTION IS APPROVED.

12. PRIOR TO BEGINNING CONSTRUCTION, CONTRACTOR SHALL VERIFY FROM THE ARCHITECTURAL DRAWINGS ALL DIMENSION, DETAILS, AND TREATMENTS FOR THE PROPOSED BUILDINGS, WALKWAYS, AND OTHER PROPOSED CONSTRUCTION WHERE INDICATED ON THE PLANS. ANY DISCREPANCIES SHALL IMMEDIATELY BE REPORTED TO DESIGN ENGINEER.

13. THE CONTRACTOR IS TO VERIFY INVERT, SIZE AND LOCATION OF BUILDING UTILITY CONNECTIONS WITH THE MECHANICAL PLANS PRIOR TO PLACEMENT OF UNDERGROUND UTILITIES.

14. NO UNDERGROUND SOILS INVESTIGATION HAS BEEN PERFORMED BY WALTER L. PHILLIPS, INC. ALL SOILS INFORMATION PRESENTED AS PART OF THIS SITE PLAN HAS BEEN PREPARED BY OTHERS AND IS INCLUDED AS REQUIRED FOR CITY OF FALLS SITE PLAN APPROVAL.

15. THE CONTRACTOR SHALL REMOVE EXISTING BUILDINGS, FENCES AND OTHER EXISTING PHYSICAL FEATURES AS REQUIRED.

16. ALL PROPOSED SIDEWALK, CG-6, CG-2 OR CG-6R IS TO BE CONSTRUCTED WITH A MINIMUM 4" AGGREGATE BASE.

17. EXISTING CONSTRUCTION SHALL BE REMOVED TO NEAREST JOINT. NEW CONSTRUCTION SHALL BE PROVIDED AS SHOWN AND ANY DAMAGED AREA SHALL BE REPAIRED TO MATCH CONDITIONS EXISTING PRIOR TO CONSTRUCTION.

18. DAMAGE TO ANY EXISTING ENTRANCES, CURB AND GUTTER, PAVEMENT OR OTHER EXISTING STRUCTURES NOT PROPOSED TO BE DISTURBED WITH THIS DEVELOPMENT, WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE REPAIRED TO THE SATISFACTION OF THE CITY OF FALLS CHURCH, THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND ANY ADJOINING OWNERS THAT MAY BE AFFECTED.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING A SMOOTH TRANSITION TO EXISTING CURB.

20. ALL PRIVATE BUILDING CONNECTIONS ARE TO BE INSTALLED IN ACCORDANCE WITH THE CURRENT PLUMBING CODE.
21. SEE ARCHITECTURAL AND/OR LANDSCAPE DRAWINGS FOR DIMENSIONS AND DETAILS FOR ALL RETAINING WALLS. ALL ON-SITE RETAINING WALLS ARE SUBJECT TO A SEPARATE BUILDING PERMIT TO BE OBTAINED BY OWNER. THIS PLAN IS FOR APPROXIMATE LOCATION AND PROPOSED GRADING ONLY. GEOTECHNICAL AND STRUCTURAL DESIGN TO BE ACCOMPLISHED BY OTHERS. RETAINING WALLS SHOWN ON THIS PLAN ARE FOR THE PURPOSES OF DEMONSTRATING THE PROPOSED TOP AND BOTTOM ELEVATIONS AND LOCATION OF THE WALLS ONLY. RETAINING WALLS ARE TO BE MAINTAINED BY THE PROPERTY OWNERS.

22. TOPS OF EXISTING STRUCTURES WHICH REMAIN IN USE ARE TO BE ADJUSTED IN ACCORDANCE WITH THE GRADING PLAN. ALL PROPOSED STRUCTURE TOP ELEVATIONS ARE TO BE VERIFIED BY THE CONTRACTOR WITH THE SITE GRADING PLANS. IN CASE OF CONFLICT, THE GRADING PLAN SHALL SUPERSEDE PROFILE ELEVATIONS. MINOR ADJUSTMENTS TO MEET FINISHED GRADE ELEVATIONS MAY BE REQUIRED.

23. SEE LANDSCAPE PLAN FOR ALL ON-SITE SIDEWALK, PLANTING AND IRRIGATION DETAILS.

24. THE DESIGN, CONSTRUCTION, FIELD PRACTICES AND METHODS SHALL CONFORM TO THE REQUIREMENTS SET FORTH BY THE CITY OF FALLS CHURCH AND ITS CURRENT ZONING ORDINANCE AND CONSTRUCTION STANDARDS MANUAL. FAILURE TO COMPLY WITH THE CODE, APPLICABLE MANUALS, PROVISIONS OF THE CONSTRUCTION AND ESCROW AGREEMENTS OR THE PERMITS SHALL BE DEEMED A VIOLATION.

25. THE APPROVAL OF THESE PLANS SHALL IN NO WAY RELIEVE THE OWNER/DEVELOPER OR HIS AGENT OF ANY LEGAL RESPONSIBILITIES WHICH MAY BE REQUIRED BY THE CODE OF VIRGINIA OR ANY ORDINANCE ENACTED BY THE GOVERNING AGENCY.

26. A MINIMUM PERMISSIBLE GRADE OF 1.00% IS REQUIRED FOR PAVEMENT TO ASSURE POSITIVE DRAINAGE. IF THERE IS EXISTING PAVEMENT WHICH IS TO REMAIN DISTURBED DURING CONSTRUCTION AND IS LESS THAN 1.00%, THEN THE CONTRACTOR IS TO CHECK TO MAKE SURE THE SITE AREA WILL HAVE ADEQUATE DRAINAGE.

27. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE SURE THAT ANY EXISTING LANDSCAPING WHICH IS TO BE RELOCATED ON THE SITE WILL BE CAREFULLY STORED IN A DESIGNATED AREA BEFORE BEING REPLANTED. COORDINATION WITH THE OWNER FOR MUTUALLY AGREEABLE STORAGE LOCATIONS FOR LANDSCAPE MATERIAL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT OF PLANT MATERIAL THAT DOES NOT SURVIVE STORAGE AND REPLANTING.

28. CONSTRUCTION STAKEOUT SHALL BE UNDER THE DIRECT SUPERVISION OF A LICENSED LAND SURVEYOR IN THE COMMONWEALTH OF VIRGINIA.

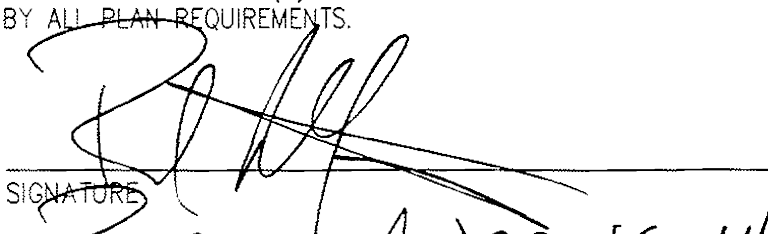
29. NO EVIDENCE OF GRAVES OR BURIAL SITES HAS BEEN FOUND ON THIS PROPERTY.

30. A WALL CHECK SURVEY WILL BE REQUIRED WHEN THE BUILDING RISES ABOVE GRADE DURING CONSTRUCTION.

31. THE PROPERTY OWNER(S) HEREBY JOIN IN THE SITE PLAN AND AGREE TO BE BOUND BY ALL PLAN REQUIREMENTS.
- SIGNATURE

NAME

TITLE



ROBERT A. YOUNG

MANAGING MEMBER

4/18/17

DATE
- CITY OF FALLS CHURCH SEWER MAIN CONSTRUCTION NOTES
1. Sewer main construction shall comply with the latest issues of the City of Falls Church Technical Specifications and Standard Details for Sewer Main Construction, DEQ/VDH Manual of Practice for Sewerage Systems, VDOT Road & Bridge Specifications & Standards, and Fairfax County Public Facility Manual (PFM).

2. Prior to commencing the sewer main construction, the Contractor shall verify of all the underground utilities (Power, Gas, Telephone, TV Cables, Water, Storm Sewer, within the project site. The contractor shall notify MISS UTILITY @ 811 Three (3) working days in advance. The Contractor shall be solely and entirely liable for any accident and/or damage caused by the construction of this project.

3. The Contractor shall notify the City of Falls Church, Department of Public Works, 703-248-5350, of any conflict with other existing utilities in the field at least (3) working days in advance, in order for the City to correct or adjust the design prior to installing the affected portion of sewer.

4. All sewer mains shall be PVC pipes SDR-35, unless otherwise approved by the City of Falls Church.

5. There is no sewer main less than eight (8) inches in diameter allowed to be permanently installed in the City of Falls Church Sewer System.

6. Sewer house service connection (lateral) and sewer tap to the main shall be privately owned and maintained. The City's responsibility stops at the sewer main, located in the street right-of-way or easement.

7. All construction must be done in compliance with The Occupational Safety and Health Act (OSHA) of 1970, and all rules and regulations thereto appurtenant.

8. The Contractor shall be responsible of any repair and restoration required prior to finish grading and surfacing of the streets and/or easements. Final acceptance will not be considered or granted until after the streets have been resurfaced or the easements finally graded to equal or better than the original condition.

9. Tapping into existing manholes for a sewer pipe 10" or less in diameter will be done by coring. Pipe sizes 12" diameter and larger may be connected to the manhole wall with a short length of pipe with a joint within two feet (2') of the inside face of the manhole wall.

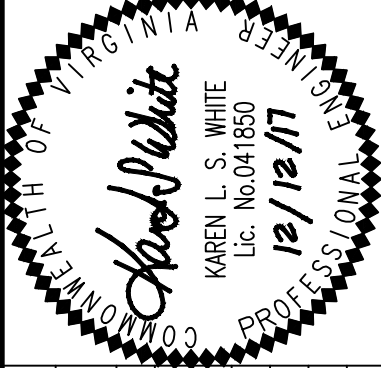
10. The lateral connection to the main sewer shall be installed at two feet (2') minimum distance from any pipe joint (center to center). This shall also apply to the distance between 2 laterals.

11. Manhole frames subject to 115-20 highway loading shall be set in an approved non-shrink groud.

12. Sewer subject to vehicle traffic shall be installed with a minimum cover of 6 feet. Otherwise, it shall be protected from effects of traffic with HS-20 highway loading.
- BUILDING HEIGHT
- | UNIT 1 - TINNER | | UNIT 2 - TINNER | | UNIT 3 - REVERSE TINNER | | UNIT 4 - REVERSE TINNER | | UNIT 5 - WHITNEY | |
|-----------------------|----------|-----------------------|----------|-------------------------|----------|-------------------------|----------|-----------------------|----------|
| EXISTING | PROPOSED | EXISTING | PROPOSED | EXISTING | PROPOSED | EXISTING | PROPOSED | EXISTING | PROPOSED |
| 352.60 | 353.00 | 352.40 | 352.80 | 347.45 | 347.50 | 348.22 | 348.70 | 348.79 | 349.70 |
| 352.71 | 353.00 | 352.80 | 353.00 | 346.68 | 346.50 | 347.79 | 348.00 | 348.24 | 349.00 |
| 350.98 | 351.50 | 350.95 | 351.50 | 346.8 | 346.90 | 347.42 | 347.50 | 347.72 | 348.20 |
| 350.98 | 351.80 | 350.99 | 351.50 | 347.21 | 347.80 | 347.55 | 348.00 | 348.30 | 348.60 |
| 351.81 | 352.32 | 351.78 | 352.20 | 347.03 | 347.17 | 347.74 | 348.05 | 348.26 | 348.87 |
| LOWEST AVG. GRADE | 351.81 | LOWEST AVG. GRADE | 351.78 | LOWEST AVG. GRADE | 347.03 | LOWEST AVG. GRADE | 347.74 | LOWEST AVG. GRADE | 348.26 |
| MAX. BLDG. HT | 376.81 | MAX. BLDG. HT | 376.78 | MAX. BLDG. HT | 372.03 | MAX. BLDG. HT | 372.74 | MAX. BLDG. HT | 373.26 |
| FF | 353.5 | FF | 353.5 | FF | 349.5 | FF | 350 | FF | 351 |
| BLDG. HT FROM FF | | BLDG. HT FROM FF | | BLDG. HT FROM FF | | BLDG. HT FROM FF | | BLDG. HT FROM FF | |
| BLDG. HT | 20.94 | BLDG. HT | 20.94 | BLDG. HT | 20.94 | BLDG. HT | 21.38 | BLDG. HT | 21.38 |
| ELEVATION | 374.44 | ELEVATION | 374.44 | ELEVATION | 370.44 | ELEVATION | 371.38 | ELEVATION | 372.38 |
| TOTAL BUILDING HEIGHT | 22.63 | TOTAL BUILDING HEIGHT | 22.66 | TOTAL BUILDING HEIGHT | 23.41 | TOTAL BUILDING HEIGHT | 23.64 | TOTAL BUILDING HEIGHT | 24.12 |

UNIT 6 - WHITNEY		UNIT 7 - REVERSE TINNER		UNIT 8 - WHITNEY		UNIT 9 - WHITNEY		UNIT 10 - REVERSE TINNER	
EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
350.72	350.72	350.91	351.40	350.93	351.30	350.07	351.00	348.99	351.00
349.50	350.00	351.09	351.60	350.93	351.40	350.41	351.30	349.80	351.00
348.60	349.00	349.51	349.80	348.31	349.80	348.31	349.50	347.92	349.50
349.45	349.90	349.91	349.80	348.22	349.80	348.22	349.80	348.01	350.00
349.56	349.90	350.35	350.65	349.51	350.57	349.25	350.40	348.68	350.37
LOWEST AVG. GRADE	349.56	LOWEST AVG. GRADE	350.35	LOWEST AVG. GRADE	349.51	LOWEST AVG. GRADE	349.25	LOWEST AVG. GRADE	348.68
MAX. BLDG. HT	374.56	MAX. BLDG. HT	375.35	MAX. BLDG. HT	374.51	MAX. BLDG. HT	374.25	MAX. BLDG. HT	373.68
FF	352	FF	352.5	FF	353	FF	352.8	FF	352.2
BLDG. HT FROM FF		BLDG. HT FROM FF		BLDG. HT FROM FF		BLDG. HT FROM FF		BLDG. HT FROM FF	
BLDG. HT	21.38	BLDG. HT	21.38	BLDG. HT	21.38	BLDG. HT	21.38	BLDG. HT	21.38
ELEVATION	373.38	ELEVATION	373.88	ELEVATION	374.38	ELEVATION	374.18	ELEVATION	373.58
TOTAL BUILDING HEIGHT	23.82	TOTAL BUILDING HEIGHT	23.53	TOTAL BUILDING HEIGHT	24.87	TOTAL BUILDING HEIGHT	24.93	TOTAL BUILDING HEIGHT	24.90

COMMON HOUSE	
EXISTING	PROPOSED
352.53	352.50
352.24	352.10
351.14	351.90
351.88	351.80
351.94	352.07
LOWEST AVG. GRADE	351.94
MAX. BLDG. HT	376.94
FF	353
BLDG. HT FROM FF	
BLDG. HT	21.04
ELEVATION	374.04
TOTAL BUILDING HEIGHT	22.10
- ZONING TABULATION
- EXISTING ZONE: R-1A
SITE AREA: 54,425 SF OR 1.2494 AC
- PROPOSED SPECIAL EXCEPTION DEVELOPMENT FOR COTTAGE HOUSING IN ACCORDANCE WITH ZONING ORDINANCE SECTION 48-241(a):
- | | REQUIRED | PROVIDED |
|--------------------------------|--|---|
| MAX. BUILDING HT. | 25 FT.
2 STORIES
(2ND STORY TO BE MAXIMUM OF 1/2 FOOTPRINT OF 1ST FLOOR) | SEE BELOW FOR BUILDING HEIGHT PROVIDED
2 STORIES |
| MIN. YARD REQUIREMENTS: | | |
| FRONT (RAILROAD AVENUE) | 20 FT. | 20.2 FT. |
| SIDE (NORTHERN NVRPA PROPERTY) | 10 FT. | 13.0 FT. |
| SIDE (WESTERN PROPERTY) | 15 FT. | 61.4 FT. |
| REAR (SOUTHERN PROPERTY) | 20 FT. | 21.4 FT. |
- | | |
|-----------------------|--|
| DENSITY REQUIREMENTS: | |
| DWELLING UNITS | 54,425 / 10,000 = 5.44 * 2 = 10.89
MAXIMUM 10 UNITS ALLOWED
PROPOSED 10 UNITS PROVIDED |
| COVERAGE: | |
- | IMPERVIOUS AREAS | | | AREA TOWARDS IMPERVIOUS TOTAL WITH 25% CREDIT FOR PERMEABLE PAVEMENT WALKS/DRIVEWAYS |
|------------------|---------------|---------------|--|
| ITEM | EXISTING (SF) | PROPOSED (SF) | |
| BUILDING(S) | 0 | 14261 | 14261 |
| DRIVEWAYS | 1479 | 4036 | 3027 |
| WALKS/MISC | 0 | 935 | 701.25 |
| TOTAL | 1479 | 19232 | 17990 |
- | | | |
|---------------------------------|--------------|-----------|
| SITE AREA: | 54,425 SF | |
| IMPERVIOUS AREA: | 17,990.00 SF | |
| MAX IMPERVIOUS AREA ALLOWED: | 35.00% | 19,048 SF |
| TOTAL IMPERVIOUS AREA PROVIDED: | 33.05% | 17,990 SF |
- | | | |
|-----------------------------------|--------|-----------|
| MAX BUILDING COVERAGE ALLOWED: | 30.00% | 16,327 SF |
| TOTAL BUILDING COVERAGE PROVIDED: | 26.20% | 14,261 SF |
- NOTE: MINIMUM 655 SF BUILDING TO BE TREATED WITH SOLAR OR GREEN ROOF TO OBTAIN 5% BONUS BUILDING COVERAGE ALLOWANCE ABOVE 25%. DEVELOPER INTENDS TO USE SOLAR PANELS FOR ENTIRE CARPORT ROOF - FINAL DESIGN TO BE DETERMINED DURING SITE PLAN
-
- VICINITY MAP
- SCALE: 1"=2000'
- PARKING TABULATION
- PARKING REQUIRED:
1.25 SPACES PER UNIT
10 UNITS X 1.25 = 12.5
13 SPACES REQUIRED
13 SPACES PROVIDED
- NOTES AND ZONING TABULATIONS
- Engineers • Planners
Landscape Architects • Arborists
WALTER L. PHILLIPS
INCORPORATED
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPH.com



REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV.	APPROVED

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\s\skproj\16081\dwg\Engineering\Site Plan\16081C-0201.dwg Xref:

SHEET: C-0201

September 7, 2017

D. Age Restriction. Occupancy of the Cottages is intended for, and shall be restricted to, households with at least one full-time resident 55 years of age or older per Cottage in order to qualify as "housing for older persons" in accordance with the

[SIGNATURES END]

Design Guidelines

Amenities in the Common House shall include, but shall not be limited to, the

E. EarthCraft Certification. Prior to approval of the site plan for the Property, the Owner will provide documentation to the City Manager certifying that the project has been designed in accordance with the EarthCraft House program certifying

building locations, tree plantings, open space, courtyards, tree buffers, and tree preservation areas, require adjustment to allow for required emergency vehicle access or are necessary to respond to subsequent comments from the Fire Marshal,

that green building elements have been incorporated into the project and would be sufficient to achieve Earthcraft Gold certification.

- C. Off-Site Stormwater Improvements.** As generally depicted on Sheet P-0401 of the CDP, the Owner shall install a stormwater conveyance system to carry stormwater runoff from Railroad Avenue and transport it across RPSF-102-1028, RPS-102-1029, and 52-102-019 (the "Adjacent Parcels") and the Property to an existing storm sewer pipe located on RPS-102-1029. Such improvements shall be at no cost to the City and at the owner's expense. Generally, the improvements shall consist of installation of two new storm inlets, the replacement of an existing storm inlet, and the installation of an underground storm pipe with a minimum diameter of 12 inches. Final inlet and pipe design for placement and sizes shall be determined at site plan in coordination with the City and owners of the Adjacent Parcels. This Voluntary Contribution IVG shall be specifically contingent upon the Owner's agreement to ensure all necessary permits are obtained from the City and the owners of the Adjacent Parcels. In the event, despite the Owner's good faith efforts, the Owner is unable to obtain such permissions from the owners of the

A. Bicycle Storage. Prior to the issuance of the first residential certificate of occupancy for the Cottages, the Owner shall install bicycle racks and one secure bicycle storage locker on the Property. Prior to approval of the site plan for the Property, the Owner shall provide the type, location, and number of bicycle racks to be provided to the City for approval. The bicycle racks shall be installed prior to the issuance of the first residential occupancy permit for the Cottages.

Adjacent Parcels within 90 days following approval of this Special Exception, then the obligation contained in this Voluntary Concession IV.G shall be deemed null and void.

- ## VI. PARK AUTHORITY COORDINATION

- Wegdon Gateway Off-Site Improvement.** Subject to City and NVRPA approval, the Owner shall install improvements to, and in the vicinity of, the existing maintenance shed and paved parking area located W&OD Trail on NVRPA Property. Such improvements may include, but are not limited to, landscaping, lighting, benches, "City of Falls Church" gateway signage, and facade/architecture enhancements to the existing maintenance shed and covered rest area. The Owner shall work with NVRPA to determine the precise locations for, and extent of, said improvements, which shall be subject to NVRPA's review and approval. In the event the aforementioned improvements are not authorized by NVRPA, the Owner shall make a one-time contribution to the City in the amount of \$100,000 to be used by the City for the same or similar street frontage enhancements. This contribution will be made prior to the issuance of the sixth (6th) occupancy permit by the City.
- B. **NVRPA Cooperation.** Prior to final site plan approval for the Property, the Owner will work with NVRPA to address concerns related to the clearing and grading on the Property, as well as stormwater management, the health of any trees located on the Property, and the safety of the existing and proposed pedestrian and bicycle paths on the W&OD Trail, and the relocation or replacement of any trees and shrubs on NVRPA property which may be damaged or removed by construction of the proposed improvements. The Owner shall coordinate with NVRPA to ensure that NVRPA should apply for and receive all necessary right-of-entry permits from the City, NVRPA, as well as temporary and permanent construction, stormwater, and maintenance agreements, as necessary, for all work conducted on the NVRPA Property.

A. Non-Transferability. The Owner acknowledges that the Application, as granted runs with the land and is not transferable to other land.

- B. Period of Validity. The Owner acknowledges that this Special Exception will automatically expire without notice, 36 months after the date of approval unless the use has been established or an above-grade building permit has been issued and

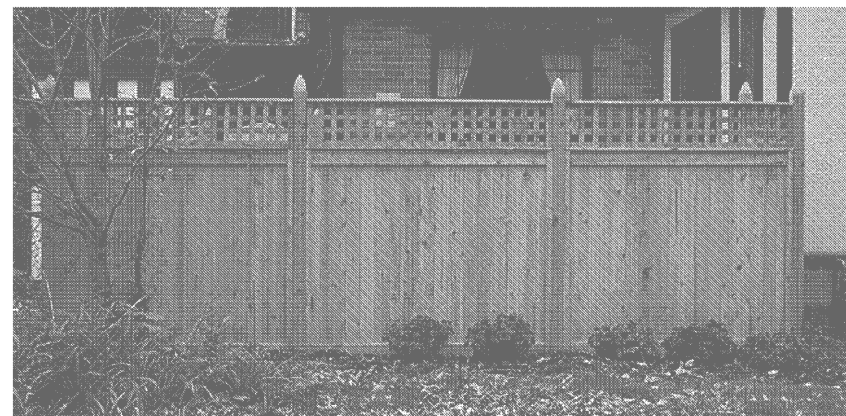
number of additional private pedestrian connections internal to the Property in conformance with the Code. All private pedestrian connections shall be maintained by the Association, to be established pursuant to Voluntary Concession IIA.

construction has commenced and been diligently pursued, in accordance with § 48-90 (d) (6) of the Code.

- Terms & Conditions Incorporated In Resolution. The Owner voluntarily submits the foregoing Voluntary Concessions to the City Council to be incorporated by reference with the resolution approving the Application.

[SIGNATURE APPEARS ON FOLLOWING PAGE]

Fencing for western frontage



CITY OF FALLS CHURCH, VIRGINIA

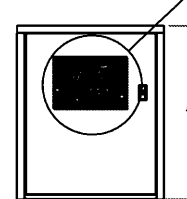
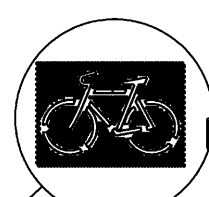
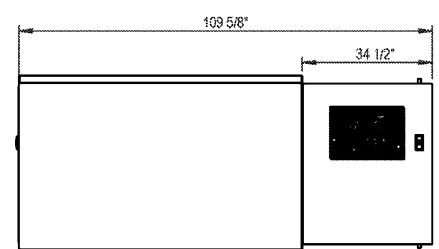
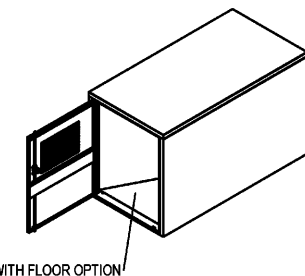
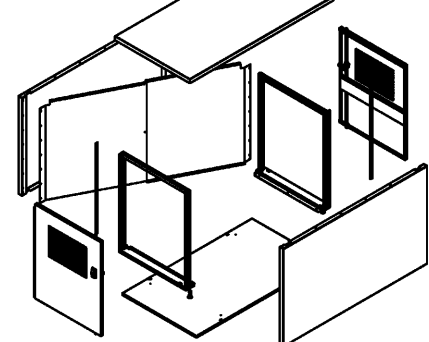
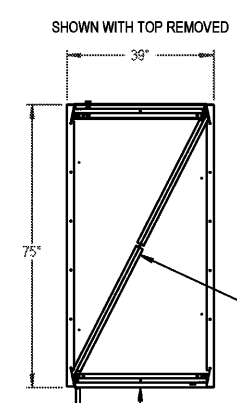
4/17/2017 VaxcelLightingLights.com Cutsheet



T00088 - Cadiz - One Light Outdoor Post Lantern by Vaxcel Lighting	
	
Space	
Family/Collection	Cadiz
Height	16.50"
Length	6.00"
Width/Diameter (in)	6.00"
# of Bulbs	1
Standard Wattage	60W
Bulb Type	Medium
Weight	3.75 lbs.
Style and Option 1	
Style	St/Bulbbed Bronze Finish with Capiz/amber Glass
Item #	T00088
Price	\$176.00



FOR POLE LIGHTING (OR SIMILAR)
CONTRACTOR TO CONFIRM SPECIFICATION WITH ARCHITECT/OWNER PRIOR TO PURCHASE.



PRODUCT: ML2F-PD
DESCRIPTION: MADLOCK™ BIKE LOCKER
1 UNIT - 2 DOOR, 2 BIKE CAPACITY
WITH FLOOR AND BIKE REAR DOOR

DATE: 5-13-16
ENG: SMC
CONFIDENTIAL DRAWING AND INFORMATION IS NOT TO BE COPIED OR DISCLOSED
TO OTHERS WITHOUT THE CONSENT OF GRABER MANUFACTURING, INC.
SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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ALL PROPRIETARY RIGHTS RESERVED.

BIKE LOCKER

CONTRACTOR TO CONFIRM SPECIFICATION WITH ARCHITECT/OWNER PRIOR TO PURCHASE

Cape May Downward Low Voltage Post Cap Light By LMT Mercer

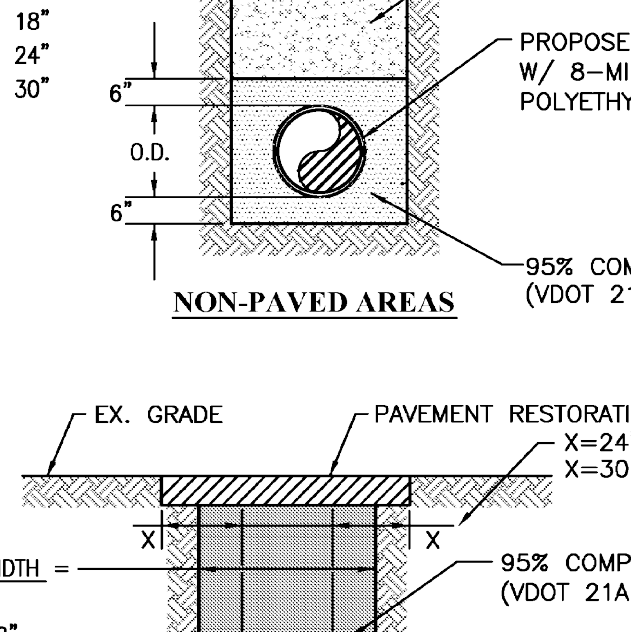
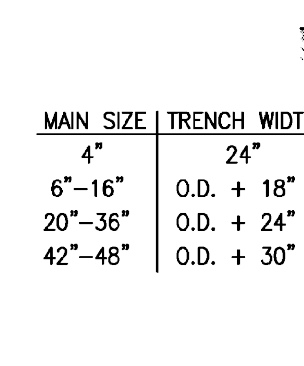


Cape May Downward Low Voltage Post Cap Light by
LMT Mercer - White

**FOR BOLLARD LIGHTING
(OR SIMILAR)**

CONTRACTOR TO CONFIRM SPECIFICATION WITH ARCHITECT/OWNER PRIOR TO PURCHASE.

PRODUCT SPECIFICATIONS	
Colors	Standard Colors: Almond, Beige, Khaki, White Premium Colors: Antique Brown, Antique Copper, Antique Gold, Antique Gray, Black Hammettone, Patina
Post Cap Opening Size	4-1/16" and 5-1/16"
Voltage	12 volts DC
Wattage	About 1 watt per cap
Transformer Type	DC
Compatible Transformers	Click here to read more about choosing the right transformer Click here to view a list of DC transformers
Compatible Dimmers	Low-Voltage LED Dimmer by LMT Mercer
Compatible Wire	18-2
Material Type	Vinyl
Bulb	Integrated LED
Color Temperature	Cool white (5000 Kelvin)
Overall Dimensions (width x depth x height)	n/a
Inset Measurement	1/2"
Wire Leads	8" harness (female connection)



20"-36" O.D. + 24"
42"-48" O.D. + 30"

6"

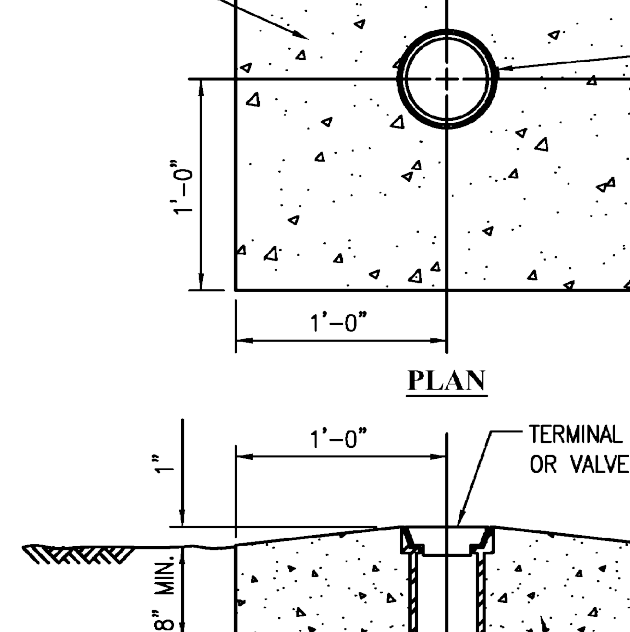
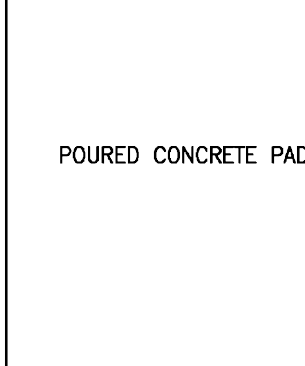
PROPOSED D.I.P. WATER MAIN
W/ 8-MIL V-BIO ENHANCED
POLYETHYLENE ENCASEMENT

6"  95% COMPACTED BACKFILL
(VDOT 21A STONE, SEE NOTE)

EXISTING PAVED AREAS

NOTES:

1. VDOT NO. 57 STONE SHALL BE USED AT CREEK CROSSINGS OR IN AREAS WHERE TRENCH CONTAINS GROUND WATER.
2. ALL MOVEMENT RESTORATION AND COMPACTED BACKFILL WITHIN VDOT RIGHT-OF-WAY SHALL ADHERE TO ALL APPLICABLE VDOT SPECIFICATIONS.
3. RESTRAINED JOINT PIPE SHALL BE IDENTIFIED WITH MARKING TAPE PLACED 2 FEET ABOVE PIPE.
4. ALL WATER MAIN INSTALLATION IN AREAS WITH PROPOSED PAVING SHALL ADHERE TO APPROVED DEVELOPMENT PLAN.



A cross-sectional diagram of a foundation system. It shows a thick concrete slab at the base, labeled "POURED CONCRETE PAD". Above this slab is a layer of reinforcement consisting of horizontal bars and vertical stirrups. The top surface of the slab is indicated by a dashed line.

ELEVATION

NOTES:



1. CONCRETE PADS FOR WATER MAIN VALVE AND TERMINAL BOX ARE TO BE INSTALLED USING REQUIREMENTS FOR CLASS D CONCRETE (2000 PSI)
2. PADS TO BE FORMED AND PROPERLY FINISHED.
3. VALVE BOX CONCRETE PAD TO BE INSTALLED ON ALL VALVES IN NON-PAVED AREAS OR AS DIRECTED BY FAIRFAX WATER.
4. GUARD POSTS ARE NOT TO BE INSTALLED AT VALVES UNLESS INDICATED ON DRAWINGS, OR AS SPECIFIED BY FAIRFAX WATER.

DATE: 7/17

NOTE:
ALL DETAILS PROVIDED ON THIS SHEET ARE CURRENT AT TIME OF SITE
PLAN PREPARATION. CONTRACTOR IS RESPONSIBLE FOR USING CURRENT
DETAILS AT TIME OF CONSTRUCTION

DETAILS

WALTER L. PHILLIPS

Engineers • Surveyors • Planners
 Landscape Architects • Arborists
 207 PARK AVENUE
 FALLS CHURCH, VIRGINIA 22046
 (703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

[illegible]

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

Invisible Structures, Inc.
1800 Jackson St., Suite 310
Golden, CO 80401
Toll Free 800-233-1510
Phone 303-233-8383
Fax 303-233-8282
E-Mail sales@invisiblestructures.com
Website www.invisiblestructures.com

April 2015

Grasspave2 Product Specification (CSI Format)

Notes: This product guide specification is written according to the Construction Specifications Institute (CSI) Format, including *MasterFormat* (1995 Edition), *SectionFormat*, and *PageFormat*, contained in the *CSI Manual of Practice*. The section must be carefully reviewed and edited by the Engineer to meet the requirements of the project and local building code. Coordinate with other specification sections and the drawings.
Delete all "Specifier Notes" when editing this section.

SECTION 32 12 43
POROUS FLEXIBLE PAVING
(Formerly 02795 Porous Paving)

Notes: This section covers Grasspave2 Porous Pavement System from Invisible Structures. The system provides vehicular and heavy load support over grass areas while protecting grass roots from harmful effects of traffic. The major components of the complete system are the Grasspave2 units, an engineered base course, Hydrogrow soil amendment/fertilizer, sand, and grass from seed, hydromulch, or sod.
Consult Invisible Structures, Inc. for assistance in editing this section for the specific application.

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Porous pavement system.

1.2 RELATED SECTIONS

- A. Section [31 20 00 – Earth Moving] [____ - ____].
B. Section [33 46 00 – Subdrainage] [____ - ____].
C. Section [32 10 00 – Bases, Ballasts, and Paving] [____ - ____].

Notes: Edit the following list as required for the project. List other sections with work directly related to the porous pavement system.

- D. Section [32 30 00 – Site Improvements] [____ - ____].
E. Section [32 90 00 Planting] [____ - ____].
F. Section [32 92 00 – Manufacturers of Turfs and Grasses] [____ - ____].
G. Section [32 80 00 – Irrigation or Section 32 84 13 – Drip Irrigation] [____ - ____].

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Notes: All measurements are subject to manufacturing tolerances, unless otherwise specified.

- A. Base Course: Sandy gravel material from local sources commonly used for road base construction (recycled materials such as crushed concrete or crushed asphalt are NOT acceptable).
- Conforming to the following sieve analysis and requirements:
 - 100 percent passing sieve size 1 inch (25 mm).
 - 90-100 percent passing sieve size 3/4 inch (19 mm).
 - 70-80 percent passing sieve size 3/8 inch (9 mm).
 - 55-70 percent passing sieve size #4.
 - 45-55 percent passing sieve size #10.
 - 25-35 percent passing sieve size #40.
 - 3-8 percent passing sieve size #200.
 - Provide a base course material nearly neutral in pH (range from 6.5 to 7.2) to provide adequate root zone development for turf.
 - Material may be either "pit run" or "crusher run." Avoid using clay based crusher run/pit run. Crusher run material will generally require coarse, well-draining sand conforming to AASHTO M6 or ASTM C 33 to be added to mixture (20 to 30 percent by volume) to ensure long-term porosity.
 - Alternative materials such as crushed shell, limerock, or crushed lava may be used for base course use, provided they are mixed with sharp sand (20 to 30 percent) to ensure long-term porosity, and are brought to proper compaction. Without added sand, crushed shell and limerock set up like concrete and become impervious.
 - Alternative size and/or composition of base course materials should be submitted to Invisible Structures, Inc. (Manufacturer) for approval.
- B. Sand Fill for Rings and Spaces Between Rings: Clean sharp sand (washed concrete sand). Choose one of the following:
- Coarse, well-draining sand, such as washed concrete sand conforming to AASHTO M6 or ASTM C-33.
 - United States Golf Association (USGA) greens, section - sand mix "The Root Zone Mixture."
- C. Turf Conditioner:
- Hydrogrow a proprietary soil amendment manufactured by Invisible Structures, Inc. and provided with Grasspave2.
 - NO SUBSTITUTIONS.

Notes: Use grass species resistant to wear by traffic generally a Blue/Rye/Fescue mix used for athletic fields in northern climates, and Zoysia, Fescue, or Bermuda types in southern climates. Check with local sod and seed suppliers for preferred mixtures. Dedicated fire lanes can use same grass species used on surrounding turf. Parking applications require greatest wear-resistant species possible, generally available only by seed or hydroseeding/hydro-mulching.

- D. Grass – Choose either sod or seed:

- Sod: [_____] Use 13 mm (0.5") thick (soil thickness) rolled sod from a reputable local grower. Species should be wear resistant, free from disease, and in excellent condition. Sod shall be grown in sand or sandy loam soils only. Sod grown in soils of clay, silt, or high organic materials such as peat, will not be accepted.
- Seed: [_____] Use seed materials, of the preferred species for local environmental and projected traffic conditions, from certified sources. Seed shall be provided in containers clearly labeled to show seed name, lot number, net weight, % weed seed content, and guaranteed % of purity and germination. Pure Live Seed types and amount shall be as shown on plans.
 - Mulch – needed only for hydroseeding: Wood or paper cellulose commercial mulch materials compatible with hydroseeding operations. Mulch depth according to mulch

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1.3 REFERENCES

- A. ASTM F 1951-08 Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.
B. ASTM D 638-10 Standard Test Method for Tensile Properties of Plastics
C. ASTM C 33 Standard Specification for Concrete Aggregates
D. AASHTO M6 Standard Specification for Fine Aggregate for Hydraulic Cement Concrete

1.4 SYSTEM DESCRIPTION

- A. The Grasspave2 porous pavement system provides vehicular and pedestrian load support for grass areas, while protecting grass roots from harmful effects of traffic.
- B. Major Components of the Complete System
- Grasspave2 units, assembled in rolls.
 - Engineered sand and gravel base course.
 - Hydrogrow soil amendment and fertilizer, supplied with Grasspave2.
 - Sand fill or USGA greens mix.
 - Selected grass from seed, hydroseeding/hydro-mulching, or sod.
 - Selected topsoil (only for seeded installation).
 - Mulch (needed only for seeded or hydroseeded installations).
- C. The Grasspave2 grass paving units, sand, and base course work together to support imposed loading.
- D. The Grasspave2 grass paving units, Hydrogrow, and sand fill contribute to vegetation support.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00.
- B. Shop Drawings: Submit design detail showing proper cross-section.
- C. Samples: Submit manufacturer's sample of Grasspave2 10" x 10" section of Grasspave2 material.
- D. Installation Instructions: Manufacturer's printed installation instructions. Include methods for maintaining installed products.
- E. Certificates:
- Manufacturer signed certificate stating the product is made in the USA.
 - Submit Material Certificates for base course and sand (or USGA mix) fill materials
 - Product certificates signed by the manufacturer certifying material compliance of polyethylene used to make Grasspave2 units.
 - ISO Certificate certifying manufacturer's quality management system is currently registered to ISO 9001:2008 quality standards.
- F. LEED Submittals: Provide documentation of how the requirements of Credit will be met:
- List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
 - Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
 - Description of Grasspave2 in stormwater design to limit the disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff and eliminating contaminants.
 - Designing elements for Grasspave2 to limit the disruption and pollution of natural water flows by managing stormwater runoff.
 - Documenting the use of Grasspave2 to reduce heat islands to minimize the impact on

- manufacturers' recommendation. DO NOT use mulch of straw, pine needles, etc., because of their low moisture holding capacity.
- Topsoil – needed only for seeding, recommended for hydroseeding: Obtain specified topsoil for a light "dusting" (no more than ½" or 13mm) above rings filled with sand for seeding germination.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine subgrade and base course installed conditions. Do not start porous paving installation until unsatisfactory conditions are corrected. Check for improperly compacted trenches, debris, and improper gradients.
- B. For fire lane installations: prior to installing base course for turf paving, obtain approval of local fire authorities of sub-base.
- C. Start of installation constitutes acceptance of existing conditions and responsibility for satisfactory performance. If existing conditions are found unsatisfactory, contact Architect for resolution.

3.2 PREPARATION

Notes: Ensure that subbase materials are structurally adequate to receive designed base course, wearing course, and designed loads. Generally, excavation into undisturbed normal strength soils will require no additional modification. Fill soils and otherwise structurally weak soils may require modifications, such as geotextiles, geogrids, and/or compaction (not to exceed 90%). Ensure that grading and soil porosity of the subbase will provide adequate subsurface drainage

- A. Subgrade Preparation:
- Prepare subgrade as specified in Section 32 10 00. Verify subgrade in accordance with porous paving system manufacturer's instructions.
 - Proper subgrade preparation will enable the Grasspave2 rolls/units to connect properly and remain

Notes: For Fire lanes and emergency access, it is recommended that Fire Department inspectors be scheduled to inspect installation of Grasspave2 during preparation of the subbase, installation of the base course, and installation of Grasspave2 units. Most small projects can accommodate these inspections all on the same day. Verify with Fire Department if certificates of inspection are required

- level and stationary after installation.
 - Excavate area allowing for unit thickness, the engineered base depth (where required), and 0.5 inch (1.25 cm) for depth of sod root zone or topsoil germination area (when applicable).
 - Provide adequate drainage from excavated area if area has potential to collect water, when working with in-place soils that have poor permeability.
 - Ensure in-place soil is relatively dry and free from standing water.
 - Uniformly grade base.
 - Level and clear base of large objects, such as rocks and pieces of wood.
- B. Base Preparation:
- Install Base as specified in Section 32 10 00. Verify engineered base (if required) is installed in accordance with porous paving system manufacturer's instructions.
 - Coordinate base installation and preparation with subdrains specified in Section 33 46 00.
 - If required, place a geotextile separation layer between the natural ground and the 'engineered base'.
 - If required, install the specified sub-drain and outlet according to construction drawings.
 - Coordinate base installation and preparation with irrigation and drip irrigation lines specified in Section 32 80 00 and 32 84 13, respectively.
 - Place engineered base in lifts not to exceed 6 inches (150 mm), compacting each lift separately to

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microclimates and human and wildlife habitats.

- G. Substitutions: No material will be considered as an equivalent to the Grasspave2 unit specified herein unless it meets all areas of this specification without exception. Manufacturers seeking to supply what they represent as equivalent material must submit records, data, independent test results, samples, certifications, and documentation deemed necessary by the Specifier to prove equivalency.
- H. Manufacturer's Material Certification: Product manufacturers shall provide certification of compliance with all applicable testing procedures and related specifications upon written request. Request for certification shall be submitted by the purchasing agency no later than the date of order placement.
- I. Product manufacturers shall also have a minimum of 30 years' experience producing products for porous pavement systems.
- J. Manufacturer Quality Certification: ISO Certification certifying manufacturer's quality management system for its Grasspave2 system is currently registered to ISO 9001:2008 quality standards. Any alternate materials submitted shall provide a certification that their porous pavement system manufacturing process is part of an ISO program and a certification will be required specifically stating that their testing facility is certified and in accordance with ISO.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect Grasspave2 units/rolls from damage during delivery and store rolls upright, under tarp, to protect from sunlight, when time for delivery to installation exceeds one week.
- C. Store Hydrogrow in a dark and dry location
- D. Handling: Protect materials during handling and installation to prevent damage

1.7 MAINTENANCE SERVICE

Notes: Once healthy turf has been established, the cell wall structure will have minimal visibility when proper turf maintenance practices are followed.

- A. Installer responsible for maintenance of grass plants – water/irrigation, fertilizing, mowing – for one growing season. DO NOT AERATE. See *Grasspave2 Maintenance Guide* from Invisible Structures
- B. System to be maintained by _____, after one growing season.

1.8 Project Conditions

- A. Maintain environmental conditions within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not begin installation of porous pavements until all hard surface paving adjacent to porous pavement areas, including concrete walks and asphalt paving, is completed.
- C. Install turf when ambient air temperatures is at least 55 degrees F (13 degrees C).
- D. In cold weather, do not use frozen materials or materials mixed or coated with ice or frost, and do not build on frozen base or wet, saturated or muddy subgrade.
- E. Protect partially completed paving against damage from other construction traffic when work is in progress.
- F. Adequately water sod or grass seed to assure germination of seed and growth of root system.
- G. Grass coverage on the sand-filled Grasspave2 rings must be completed within one week: See *Part 3 Execution*.
- H. DO NOT DRIVE, PARK ON, or use Grasspave2 system for two or three mowing cycles until grass root system has matured (about 3 to 4 weeks for sod or 6 to 8 weeks for seeded areas). Any barricades constructed must still be accessible by emergency and fire equipment during and after installation.

- 95 percent Modified Proctor.
- Leave 1 inch (2.5 cm) of depth below final grade for porous paver unit and sand fill and 0.5 inch (1.25 cm) for depth of sod root zone or topsoil germination area (when applicable).

Notes: Delete requirement for on-site manufacturer's field representative if not required

3.3 ON-SITE MANUFACTURER'S FIELD REPRESENTATIVE

- A. A qualified Manufacturer's field representative shall be available for a pre-construction meeting via phone or in person and will provide installation videos, design details, installation instructions, and the technical specifications.
- B. The time for on-site observation shall be indicated in the Contract Documents and included in the base bid price.

3.4 HYDROGROW INSTALLATION

- A. Spread all Hydrogrow mix provided (spreader rate = 4.53 kg per 100 m² (10 lbs per 1076 ft²) evenly over the surface of the base course with a hand-held, or wheeled, rotary spreader.
- B. The Hydrogrow mix should be placed immediately before installing the Grasspave2.

3.5 GRASSPAVE2 INSTALLATION

- A. Install the Grasspave2 units by placing units with rings facing up, and using snap-fit connectors, pegs and holes, provided to maintain proper spacing and interlock the units. Units can be easily shaped with pruning shears or knife. Units placed on curves, slopes, and high traffic areas shall be anchored to the base course, using 40d common nails with fender washer, as required to secure units in place. Tops of rings shall be between 6 mm to 13 mm (0.25" to 0.5") below the surface of adjacent hard-surface pavements.
- B. Install sand in rings as they are laid in sections by "back-dumping" directly from a dump truck, or from buckets mounted on tractors, which then exit the site by driving over rings already filled with sand. The sand is then spread laterally from the pile using flat bottomed shovels and/or wide "asphalt rakes" to fill the rings. A stiff bristled broom should be used for final "finishing" of the sand. The sand must be "compacted" by using water from hose, irrigation heads, or rainfall, with the finish grade no less than the top of rings and no more than 6 mm (0.25") above top of rings.

3.6 INSTALLATION OF GRASS

- A. Grass coverage on the sand-filled rings must be completed within one week. Sand must be re-installed and leveled and Grasspave2 checked for integrity if rings become exposed due to wind, rain, traffic, or other factors. (Choose one paragraph below to meet grass installation method desired.)

Notes: Choose one paragraph below to match grass installation method

- Preferred method: Hydroseeding/hydro-mulching - A combination of water, seed and fertilizer are homogeneously mixed in a purpose-built, truck-mounted tank. The seed mixture is sprayed onto the site at rates shown on plans and per hydroseeding manufacturer's recommendations. Coverage must be uniform and complete. Following germination of the seed, areas lacking germination larger than 20 cm x 20 cm (8" x 8") must be reseeded immediately. Seeded areas must be fertilized and kept moist during development of the turf plants. DO NOT DRIVE ON SYSTEM. Hydroseeded/hydro-mulch areas must be protected from any traffic, other than emergency vehicles, for a period of 6 to 8 weeks, or until the root system has penetrated and established well below the Grasspave2 units.
- Install thin sod directly over sand filled rings, filled no higher than the top of the rings. Sod strips should be placed with very tight joints. Sodded areas must be fertilized and kept moist during root

1.9 LIMITED WARRANTY

- A. Invisible Structures, Inc. (ISI) warrants to its purchasers that all products furnished by ISI will be free from defects in material and/or workmanship.
- B. This warranty shall be extended for a period of five (5) years following the date of shipment by ISI.
- C. Providing a written claim is presented to ISI within the warranty period and after inspection by ISI showing the materials have failed under this warranty, all defective materials shall be refurbished under this warranty, at no charge, excluding re-installation costs. This in lieu of all other warranties expressed or implied and is the sole warranty extended by ISI.
- D. Our liability under this warranty is limited to the refurbishing of materials and does not include any responsibility for incidental, consequential, or other damages of any nature.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Invisible Structures, Inc., which is located at: 1600 Jackson St. Suite 310 ; Golden, CO 80401; Toll Free Tel: 800-233-1510; Tel: 303-233-8383; Email: request info (sales@invisiblestructures.com); Web: www.invisiblestructures.com.
- B. Substitutions: Not permitted.

2.2 GRASSPAVE2

- A. Composition:
- Manufactured in the USA.
 - High density polyethylene (HDPE): 100 percent recycled materials.
 - Color: black
 - Color Uniformity: Uniform color throughout all units rolls.
 - Carbon Black for ultraviolet light stabilization.
 - Hydrogrow soil amendment and fertilizer, provided by manufacturer with Grasspave2.
- B. Performance Properties:
- Maximum Loading Capability: 15,940 psi (2.29 million psf, 109,906 kPa) when filled with sand.
 - Wheelchair Access testing for ADA Compliance: Passing ASTM F 1951-08.
 - Wheelchair Access testing for ADA Compliance: Passing Rotational Penetrometer testing.
 - Tensile strength, pull-apart testing: 458 lbf/in from ASTM D638 Modified.
 - System Permeability (Grasspave2, sand, base course): 2.63 to 38.55 inches of water per hour.
 - Effective Imperviousness (E.I.): 10%.
- C. Dimensions (individual units are assembled and distributed into rolls):
- Roll area: From 108 sq ft (10 sq m) to 538 sq ft (50 sq m), in 108 sq ft (10 sq m) increments
 - Roll Widths: From 3.3 ft (1 m) to 8.2 ft (2.5 m), in 1.6 ft (0.5 m) increments.
 - Roll Lengths: From 32.8 ft (10m) to 65.6 ft (20 m), in 3.3 ft (1 m) increments.
 - Roll Weights: From 41 lbs (19kg) to 205 lbs (93kg), in 41 lbs (19 kg) increments.
 - Unit Nominal Width by Length: 20 inches by 20 inches (0.5 m by 0.5 m) or 40 inches by 40 inches (1 m by 1 m).
 - Nominal Depth: 1 inch (2.5 cm) – for rolls and individual units.
 - Unit Weight: 18 oz (510 g) or 5 lbs. (2.27 kg).
 - Volume Solid: 8 percent.

2.3 SYSTEM MATERIALS

- establishment (minimum of 3 weeks). DO NOT DRIVE ON SYSTEM: Sodded areas must be protected from any traffic, other than emergency vehicles, for a period of 3 to 4 weeks, or until the root system has penetrated and established well below the Grasspave2 units.
- Install grass seed at rates per grass type. A light "dusting" of commercial topsoil mix, not to exceed 1/2" (25 mm) will be placed above the rings and seed mix to aid germination rates. Seeded areas must be fertilized and kept moist during development of the turf plants. DO NOT DRIVE ON SYSTEM: Seeded areas must be protected from any traffic, other than emergency vehicles, for a period of 6 to 8 weeks, or until the root system has penetrated and established well below the Grasspave2 units.
 - Adequately water sod or grass seed to assure germination of seed and growth of root system.

3.7 PROTECTION

Notes: Choose one paragraph below to match grass installation method.

- A. Seeded areas must be protected from any traffic, other than emergency vehicles, for a period of 4 to 8 weeks, or until the grass is mature to handle traffic.
- B. Sodded areas must be protected from any traffic, other than emergency vehicles, for a period of 3 to 4 weeks, or until the root system has penetrated below the Grasspave2 units.

3.8 FIELD QUALITY CONTROL

- A. Remove and replace segments of Grasspave2 units where three or more adjacent rings are broken or damaged, reinstalling as specified, so no evidence of replacement is apparent.
- B. Perform cleaning during the installation of work and upon completion of the work. Remove all excess materials, debris, and equipment from site. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

3.9 MAINTENANCE

- A. Maintain grass in accordance with manufacturer's instructions and as specified in Section 32 92 00 Manufacturers of Turfs and Grasses.
- B. Lawn Care: Normal turf care procedures should be followed, including de-thatching.
- C. DO NOT AERATE. Aerator will damage the Grasspave2 units. Aeration in not necessary in a sand root zone.
- D. When snow removal is required, keep a metal edged plow blade a minimum of ¼ inch (17 mm) above the surface during plowing operations to avoid causing damage to the Grasspave2 units, or
- Use a plow blade with a flexible rubber edge, or
 - Use a plow blade with skids on the lower outside corners set so the plow blade does not come in contact with the units.

END OF SECTION

NOTE:
ALL DETAILS PROVIDED ON THIS SHEET ARE CURRENT AT TIME OF SITE
PLAN PREPARATION. CONTRACTOR IS RESPONSIBLE FOR USING CURRENT
DETAILS AT TIME OF CONSTRUCTION

GRASS PAVE SPECIFICATIONS

Engineers • Surveyors • Planners
Landscape Architects • Arborists
WALTER L. PHILLIPS
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com
INCORPORATED
DATE: 9/12/2017, 11/8/2017, 12/12/2017
CHECKED: KW
DRAWN: AJ



REVISION APPROVED BY	DATE	APPROVED	REV. BY	DATE
DESCRIPTION				
NO.				

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0206

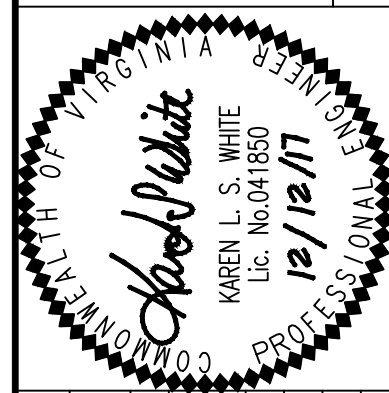


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CITY OF FALLS CHURCH, VIRGINIA

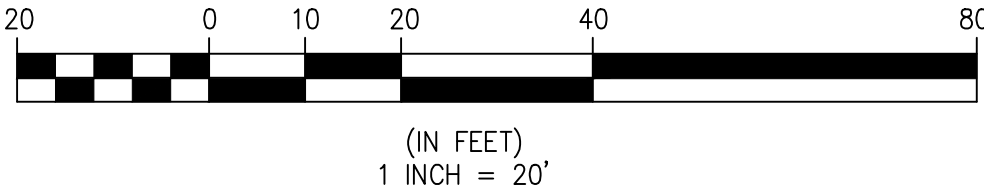
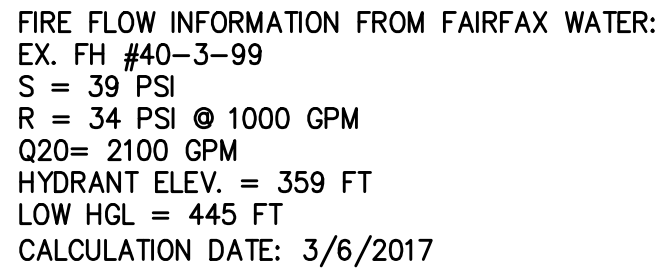
WALTER L. PHILLIPS
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 Landscape Architects • Arborists
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 www.WLPC.com

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SCALE: 1" = 20'			
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RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

SHEET: C-0302



LEGEND

PROPOSED	DESCRIPTION	EXISTING
EP	EDGE OF PAVEMENT	EP.
MH	MANHOLE	MH
WV	WATER VALVE	WV
WM	WATER METER	WM
GM	GAS METER	GM
TCB	TRAFFIC CONTROL BOX	TCB
LP	LIGHT POLE	LP
LP/S	LIGHT POLE WITH SIGNALS	LP/S
	CURB & GUTTER CG-2	
	TRANSITION FROM CG-6 TO CG-6R	
	SANITARY SEWER SL	
	CLEAN OUT C.O.	
	STORM SEWER	
	WATER MAIN	
	FIRE HYDRANT	
	PUG	
	OVERHEAD WIRES	
	UTILITY POLE	
	UNDERGROUND ELECTRIC	
	TELEPHONE	
	GAS MAIN	
	ELECTRICAL	
	TRANSFORMER	
	HANDICAP RAMP (CG-12)	
	GUARDRAIL FENCE	
	TRAFFIC FLOW	
	LIGHT	
	DOOR	
	TREES	
	LIMITS OF CLEARING AND GRADING	
	TEST PIT	

FIRE MARSHAL, SIGNAGE & MARKING PLAN

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

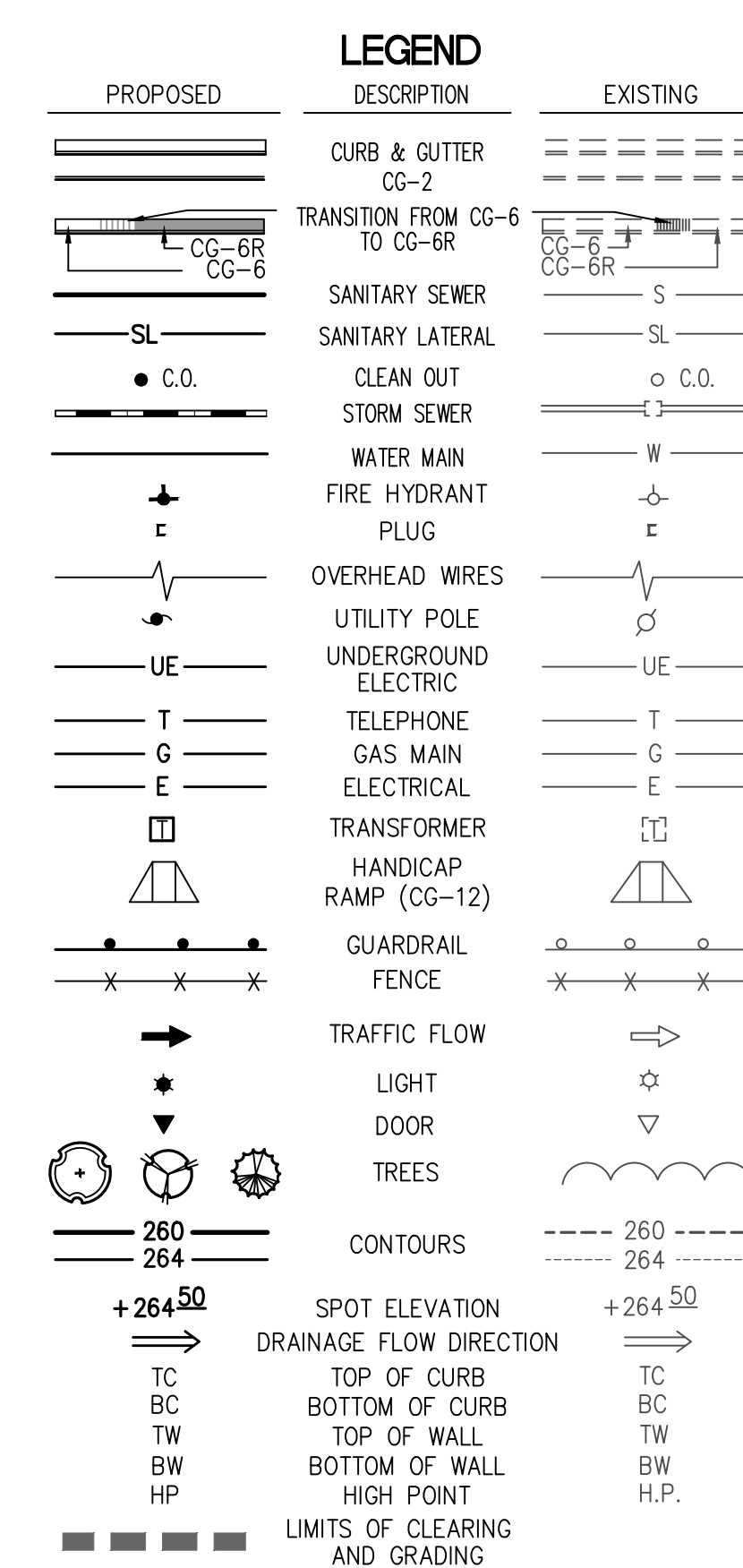
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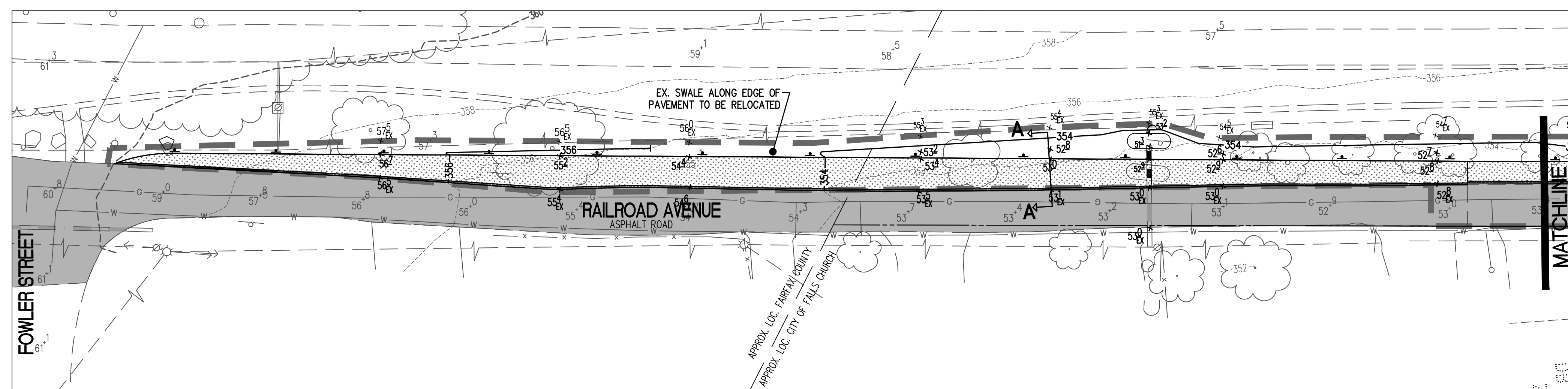
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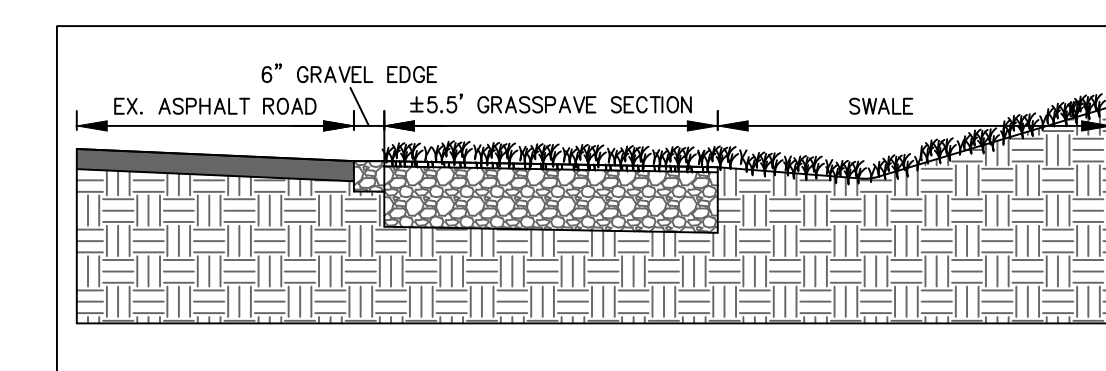
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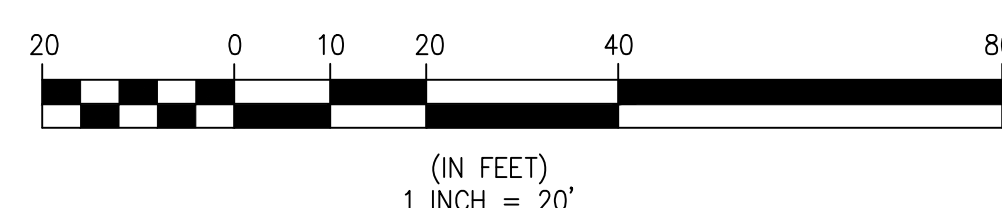
- NOTES:
1. SEE SHEET C-0201 FOR BUILDING HEIGHT CALCULATIONS.
 2. SEE SHEET C-0706 FOR BIORETENTION DETAILED GRADING.
 3. SPOT ELEVATIONS SHOWN ALONG WALKS ARE BOARDWALK ELEVATION, ELEVATED ABOVE GROUND ELEVATION.



GRASS-PAVE ADDITION GRADING SCHEMATIC



SECTION A-A
NOT-TO-SCALE



GRADING PLAN

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA



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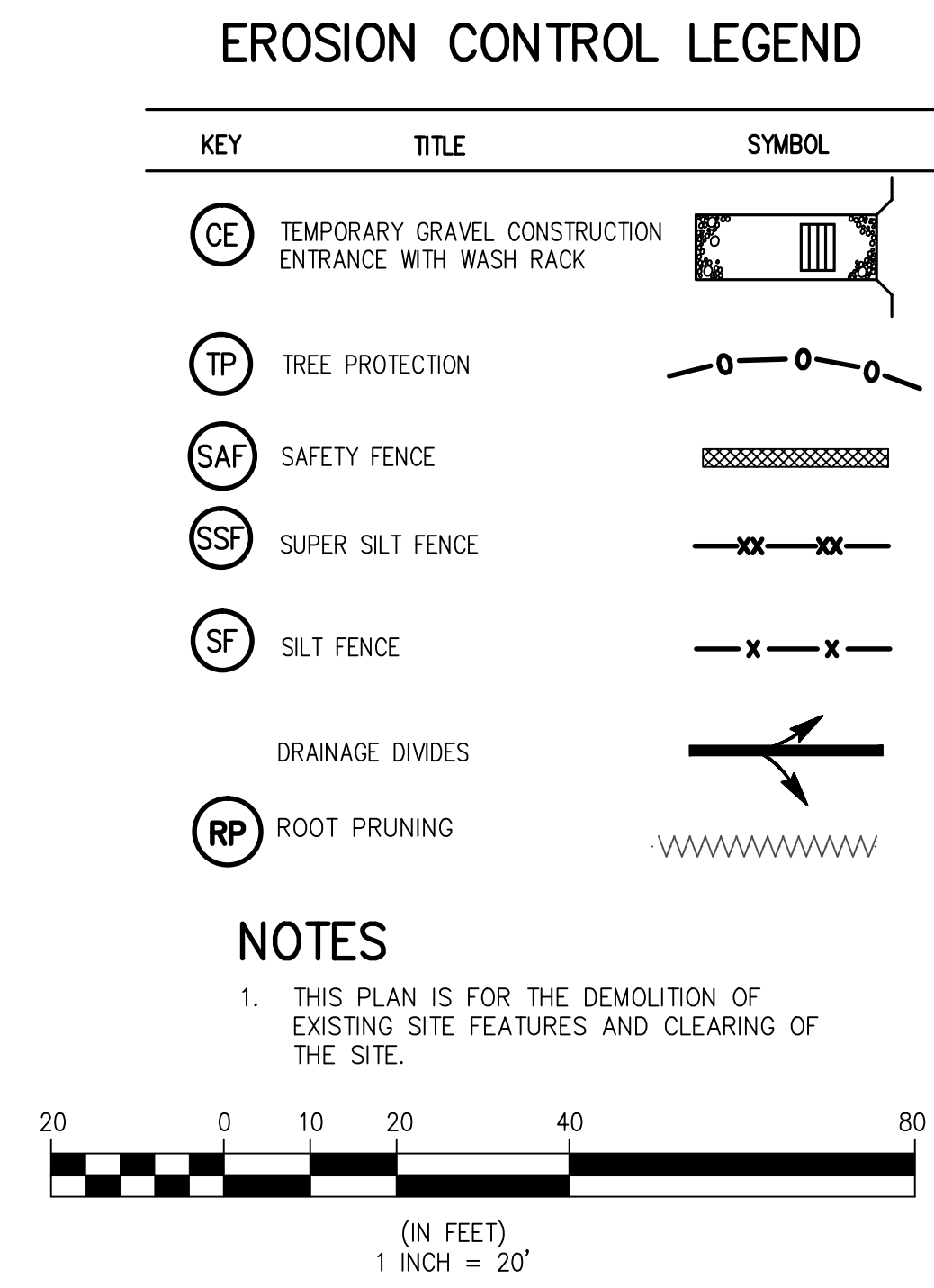
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CITY OF FALLS CHURCH, VIRGINIA



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EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION:
THE PURPOSE OF THIS PROJECT IS TO CONSTRUCT (10) COTTAGE HOMES, A COMMON HOUSE, AND A JOINT CAR PORT WITH PRIVATE DRIVE. CONSTRUCTION WILL ENTAIL APPROXIMATELY 64,463 SF OF DISTURBED AREA. OFFSITE CONSTRUCTION WILL BE LIMITED TO ROAD IMPROVEMENTS IN RAILROAD AVENUE, INSTALLATION OF UTILITY CONNECTIONS AND A POTENTIAL NEW STORM SEWER PIPE CONNECTION THROUGH THE ADJACENT PROPERTY TO THE SOUTH IF AN EASEMENT CAN BE OBTAINED.

EXISTING SITE CONDITIONS:
THE EXISTING SITE IS CURRENTLY UNDEVELOPED WITH (2) DRIVEWAYS. THE GRADES ON AVERAGE ARE 4.0-4.5% ACROSS THE ENTIRE SITE.

ADJACENT PROPERTIES:
NORTH: RAILROAD AVENUE AND NVRPA PROPERTY
WEST: SINGLE-FAMILY HOME
SOUTH: SINGLE-FAMILY HOMES
EAST: SINGLE-FAMILY HOMES

SOILS:
SEE THIS SHEET FOR SOILS MAP AND SOILS INFORMATION.

CRITICAL EROSION AREAS:
NO PART OF THE SITE IS CONSIDERED A CRITICAL EROSION HAZARD, HOWEVER VIGILANT MONITORING OF THE EROSION & SEDIMENT CONTROLS, PARTICULARLY THE SUPER SILT FENCE IS IMPORTANT FOR MAINTAINING CONTROL OF SEDIMENT ONTO ADJACENT PROPERTIES TO THE SOUTH.

PHASING NARRATIVE:
THE FOLLOWING EROSION AND SEDIMENT CONTROL MEASURES WILL BE ACCOMPLISHED IN TWO PHASES. PHASE 1 SHALL BE IN PLACE PRIOR TO CLEARING AND SHALL REMAIN IN PLACE THROUGHOUT THE CLEARING AND DEMOLITION PROCESS. THE GENERAL CONTRACTOR IS TO PROVIDE DUST CONTROL THROUGHOUT LAND DISTURBING ACTIVITIES IN ACCORDANCE WITH VESCH STANDARD 3.39. FOR ALL PHASES, HEAVY EQUIPMENT SHALL BE KEPT OUTSIDE AREAS OF PROPOSED BIOTENTION PRACTICES TO PRESERVE PREVIOUSLY TESTED INFILTRATION RATES AND AVOID COMPACTION.

PHASE 1:
AS THE FIRST ITEM OF CONSTRUCTION, THE CONTRACTOR IS TO PLACE THE SUPER SILT FENCE, SAFETY FENCE PERIMETER CONTROL AROUND THE SITE, AND TREE PROTECTION. REFER TO EROSION AND SEDIMENT CONTROL PLAN- PHASE 1 FOR LOCATION OF THESE MEASURES. THIS ACTIVITY IS TO BE FOLLOWED BY THE PLACEMENT OF THE CONSTRUCTION ENTRANCE AND TEMPORARY WATER SERVICE AS COORDINATED WITH FAIRFAX WATER. A SPRAY NOZZLE IS TO BE PROVIDED ADJACENT TO THE CONSTRUCTION ENTRANCE TO CLEAN CONSTRUCTION VEHICLES BEFORE THEY ENTER THE PUBLIC RIGHT-OF-WAY. THE CONTRACTOR IS TO MAINTAIN ADJACENT ROADWAYS AND PARKING AREAS IN A MUD AND DUST FREE CONDITION. FOLLOWING INSTALLATION OF PHASE 1 CONTROLS, THE CONTRACTOR IS TO SCHEDULE CITY INSPECTION. FOLLOWING INSPECTOR APPROVAL, SITE CLEARING AND GRADING MAY PROCEED.

PHASE 2:
SAFETY FENCE TO BE PROVIDED AROUND THE SITE PERIMETER AS SHOWN ON THE PHASE 2 E&S PLAN. UTILITY IMPROVEMENTS WILL TAKE PLACE IN RAILROAD AVENUE. EROSION AND SEDIMENT CONTROLS ARE TO BE ADJUSTED AS REQUIRED BY THE SITE CONSTRUCTION OR AS DIRECTED BY THE INSPECTOR.

IN ORDER TO ENSURE THAT THE PERMEABLE PAVEMENT DOES NOT GET CLOGGED DURING CONSTRUCTION, THE PERMEABLE PAVERS SHALL BE INSTALLED LAST AND PROTECTED UNTIL THE END OF CONSTRUCTION.

PERMANENT STABILIZATION:
PERMANENT SOIL STABILIZATION SHALL BE IN ACCORDANCE TO VESCH SECTIONS 3.29 TO 3.36. ANY SOIL NOT TO BE BROUGHT TO FINAL GRADE FOR MORE THAN 30 DAYS IS TO BE SEEDED AND MULCHED. THIS IS TO INCLUDE ANY DENUDED AREAS OR STOCKPILES. AND AREAS LEFT DORMANT OR NOT BROUGHT TO FINAL GRADE SHALL BE PERMANENTLY SEEDED AND MULCHED.

ALL STORM AND SANITARY LINES NOT IN THE STREET SHALL BE MULCHED AND SEEDED WITHIN 7 DAYS AFTER BACKFILL. NO MORE THAN 500 FEET SHALL BE OPEN AT ANY ONE TIME. ELECTRIC, TELEPHONE, CABLE, AND GAS UTILITY TRENCHES SHALL BE COMPACTED, SEEDED, MULCHED WITHIN FIVE DAYS AFTER BACKFILL.

DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE IMMEDIATELY STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

DEWATERING NOTE:
RAINWATER/GROUNDWATER ACCUMULATION FROM WITHIN THE EXCAVATION IS TO BE PUMPED OUT, AS NECESSARY. DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

MAINTENANCE PROGRAM:
THE SITE SUPERINTENDENT, OR HIS/HER REPRESENTATIVE, SHALL MAKE A VISUAL INSPECTION OF ALL MECHANICAL CONTROLS AND NEWLY STABILIZED AREAS (I.E. SEEDED AND MULCHED AREAS) ON A DAILY BASIS, ESPECIALLY AFTER A HEAVY RAINFALL EVENT TO INSURE THAT ALL CONTROLS ARE MAINTAINED AND PROPERLY FUNCTIONING. ANY DAMAGED CONTROLS SHALL BE REPAIRED PRIOR TO THE END OF THE WORK DAY INCLUDING RE-SEEDING AND MULCHING IF NECESSARY.

EROSION AND SEDIMENT CONTROL MEASURES:

- ALL EROSION AND SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO LAND DISTURBANCE ACTIVITY, FOLLOWING THE IMPLEMENTATION OF TREE PRESERVATION MEASURES.
- SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL ALL GROUND DISTURBING ACTIVITY CEASES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS IS COMPLETE.
- ALL STANDARDS AND SPECIFICATIONS REFER TO THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
- A CONSTRUCTION ENTRANCE SHALL BE INSTALLED AND MAINTAINED FOR THE DURATION OF ALL DISTURBING ACTIVITIES AS SHOWN ON THE PLAN PER STD. AND SPEC. NO. 3.02 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. NO CONSTRUCTION TRAFFIC SHALL BE PERMITTED TO ENTER THE SITE OTHER THAN THIS ENTRANCE UNTIL PARKING LOT IS PAVED.
- ALL AREAS DISTURBED BY CONSTRUCTION THAT ARE NOT TO BE CONSTRUCTED UPON SHALL BE PERMANENTLY STABILIZED IMMEDIATELY FOLLOWING FINISH GRADING BY SEEDING AND MULCHING PER STD. AND SPEC. NO. 3.31 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
- BARE SOIL SURFACES NOT AT FINISH GRADE, WHICH WILL BE EXPOSED MORE THAN 7 DAYS, SHALL BE STABILIZED WITH TEMPORARY SEEDING AND MULCHING PER STD. AND SPEC. NO. 3.32 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

GENERAL LAND CONSERVATION NOTES

- NO DISTURBED AREA WILL BE DENUEDED FOR MORE THAN 7 CALENDAR DAYS UNLESS OTHERWISE AUTHORIZED BY THE DIRECTOR OR HIS AGENT.
- ALL EROSION AND SILTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO CLEARING AND GRADING.
- ALL STORM AND SANITARY LINES NOT IN STREETS ARE TO BE MULCHED AND SEEDED WITHIN 5 DAYS AFTER BACKFILL. NO MORE THAN 500 FEET ARE TO BE OPEN AT ANY ONE TIME.

- ELECTRIC POWER, TELEPHONE, AND GAS SUPPLY TRENCHES AREA TO BE COMPACTED, SEEDED, AND MULCHED WITHIN 5 DAYS AFTER BACKFILL.
- DURING CONSTRUCTION, MONITOR NEAREST INLETS TO ENSURE NO CONSTRUCTION SEDIMENT ENTERS THE INLETS. PROVIDE INLET PROTECTION AND MONITOR THE SEDIMENT LEAVING THE SITE.
- ANY DISTURBED AREA NOT COVERED BY NOTE #1 ABOVE AND NOT PAVED, SODDED OR BUILT UPON BY NOVEMBER 1ST, OR DISTURBED AFTER THAT DATE, IS TO BE MULCHED WITH HAY OR STRAW MULCH AT THE RATE OF TWO TONS PER ACRE AND OVER-SEEDED NO LATER THAN MARCH 15TH.
- AT THE COMPLETION OF CONSTRUCTION PROJECTS, AND PRIOR TO THE RELEASE OF THE BOND, ALL TEMPORARY SILTATION AND EROSION CONTROLS SHALL BE REMOVED AND DISTURBED AREAS SHALL BE STABILIZED.
- IF THE MAXIMUM PERIOD FOR DENUDATION IS EXCEEDED AND ANY AREAS REMAIN EXPOSED WITHOUT COVER OR SURFACE, THE CITY MAY (IN THE EVENT THE DEVELOPER DOES NOT) INSTALL SUCH GROUND COVER OR OTHER STABILIZING DEVICES AND/OR MATERIAL TO THE MINIMUM EXTENT NECESSARY TO ACHIEVE EROSION AND SEDIMENT CONTROL EQUAL TO THAT WHICH WOULD HAVE BEEN FURNISHED BY THE PERMANENT COVER SHOWN ON THE APPROVED PLANS. THE COST OF ANY SUCH TEMPORARY MEASURES TAKEN BY THE CITY SHALL BE BORNE BY THE DEVELOPER AND SHALL BE A CHARGE AGAINST THE CONSERVATION DEPOSIT.
- WHERE CONSISTENT WITH JOB SAFETY REQUIREMENTS, ALL EXCAVATED MATERIAL IS TO BE PLACED ON THE UPHILL SIDE OF TRENCHES. NO MATERIAL IS TO BE PLACED IN STREAMBEDS. NO STOCKPILE IS PERMITTED. WHERE SOIL IS PLACED ON DOWNHILL SIDE OF TRENCHES, IT IS TO BE BACK-SLOPED TO DRAIN TOWARD THE TRENCH. WHEN NECESSARY TO DEWATER THE TRENCHES, THE PUMP DISCHARGE HOSES MUST OUTLET IN A STABILIZED AREA TO AN EXISTING STORM INLET.

MAINTENANCE NOTES

- MAINTENANCE OF THE TEMPORARY CONSTRUCTION ENTRANCE SHALL BE REQUIRED TO PREVENT MUD DEPOSITS IN THE RIGHT-OF-WAY.
- INLET PROTECTION SHALL BE INSPECTED AT THE END OF EACH DAY AND AFTER EACH RAINFALL AND REQUIRED REPAIRS MADE IMMEDIATELY.
- EROSION AND SEDIMENT CONTROL DEVICES SHALL BE MAINTAINED IN PLACE UNTIL GROUND DISTURBING CONSTRUCTION AND PERMANENT STABILIZATION IS COMPLETE AND SHALL BE REMOVED BY PERMISSION OF THE COUNTY INSPECTOR.
- FILTER STONE SHALL BE REGULARLY CHECKED TO ENSURE THAT FILTRATION PERFORMANCE IS MAINTAINED. STONE CHOKED WITH SEDIMENT SHALL BE REMOVED AND CLEANED OR REPLACED.

SOIL MAP
N.T.S.



SOIL INFORMATION

Map Unit Description: Wheaton-Glenelg complex, 2 to 7 percent slopes--Falls Church City, Virginia

Falls Church City, Virginia

105B--Wheaton-Glenelg complex, 2 to 7 percent slopes

Map Unit Setting

National map unit symbol: 2218f
Mean annual precipitation: 37 to 49 inches
Mean annual air temperature: 45 to 67 degrees F
Frost-free period: 185 to 212 days
Farmland classification: Not prime farmland

Map Unit Composition

Wheaton and similar soils: 45 percent
Glenelg and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wheaton

Setting

Landform: Interfluvies
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Interfluvie
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mine spoil or earthy fill derived from phyllite

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 60 inches: loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Glenelg

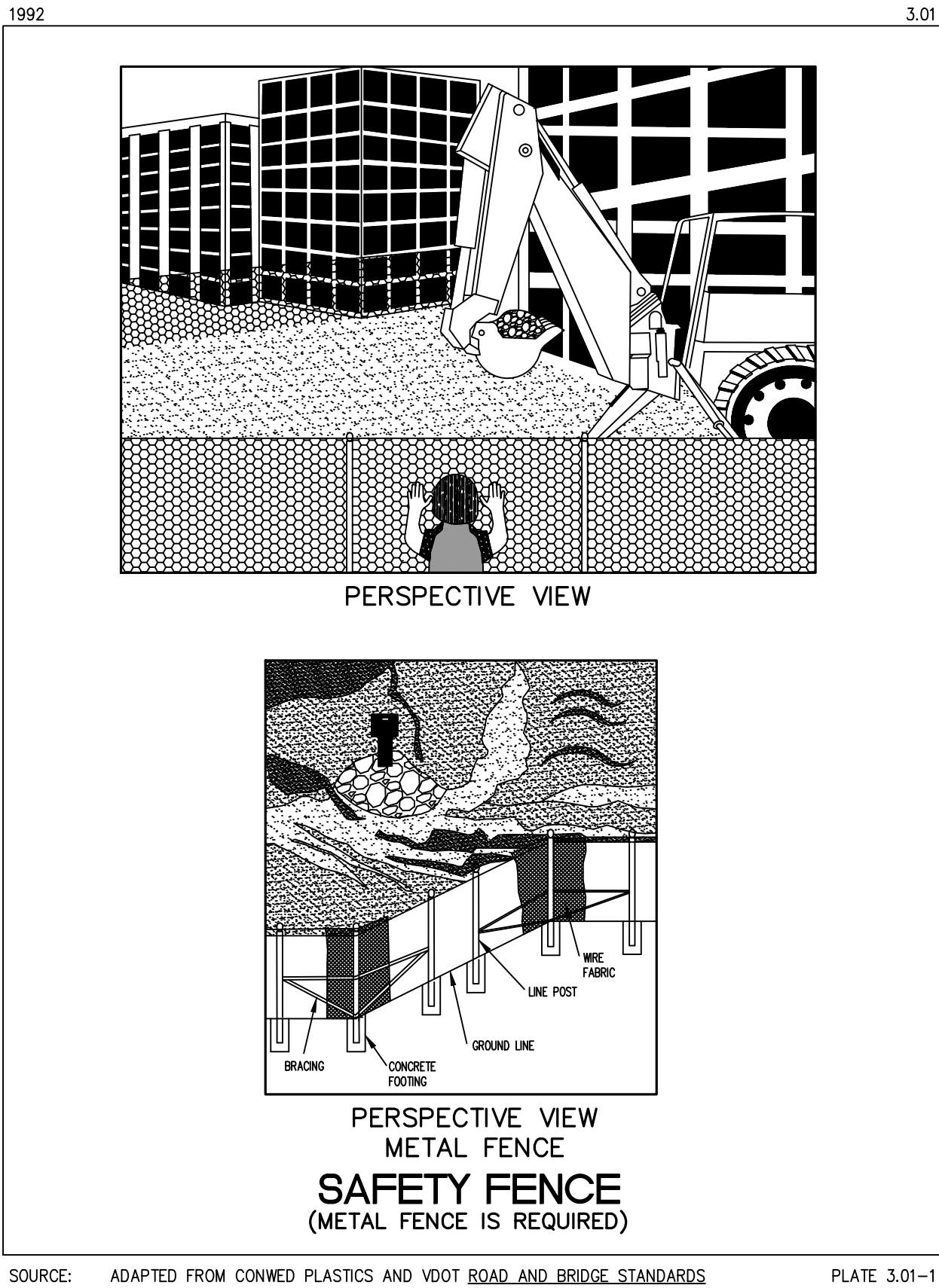
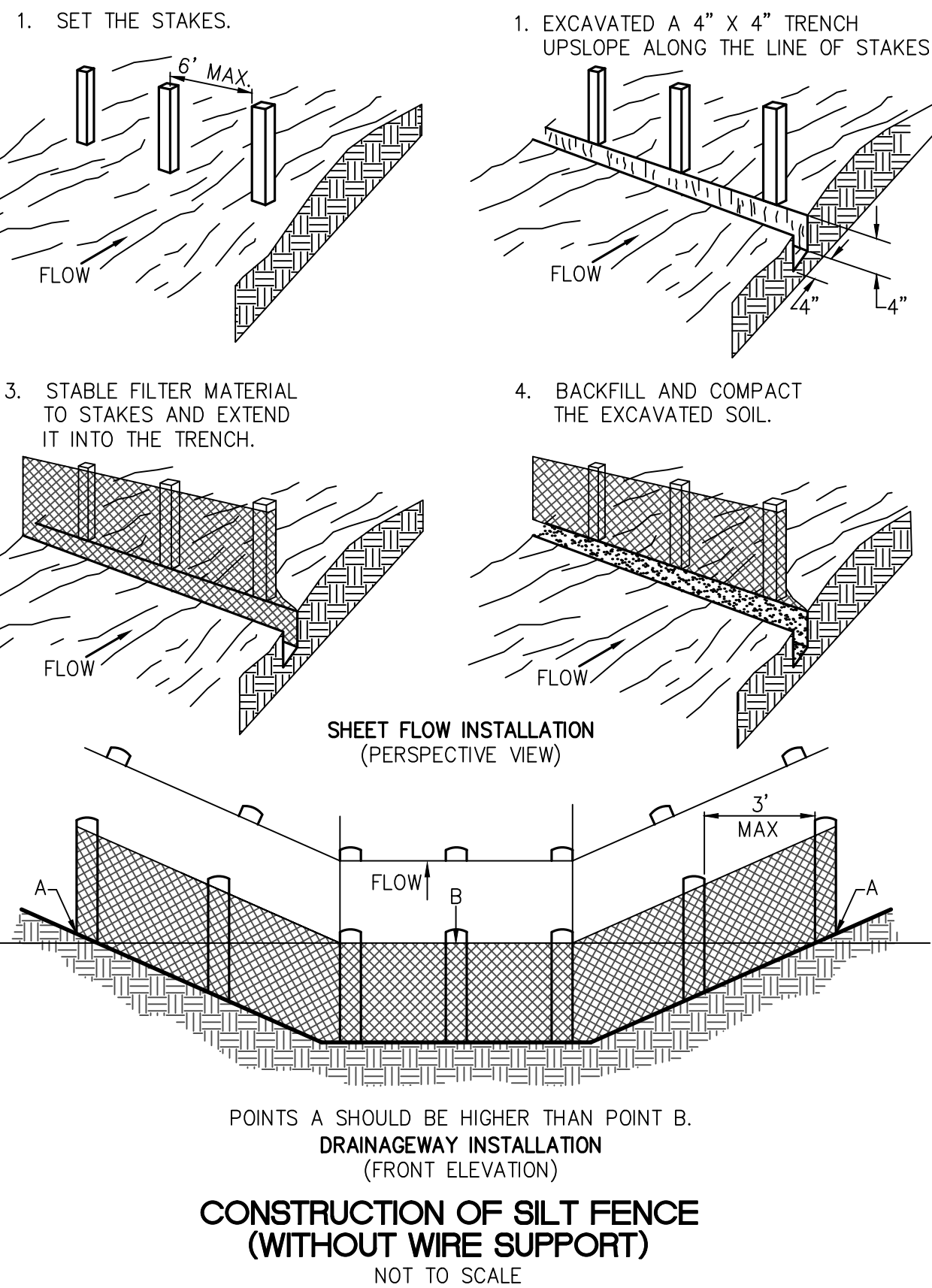
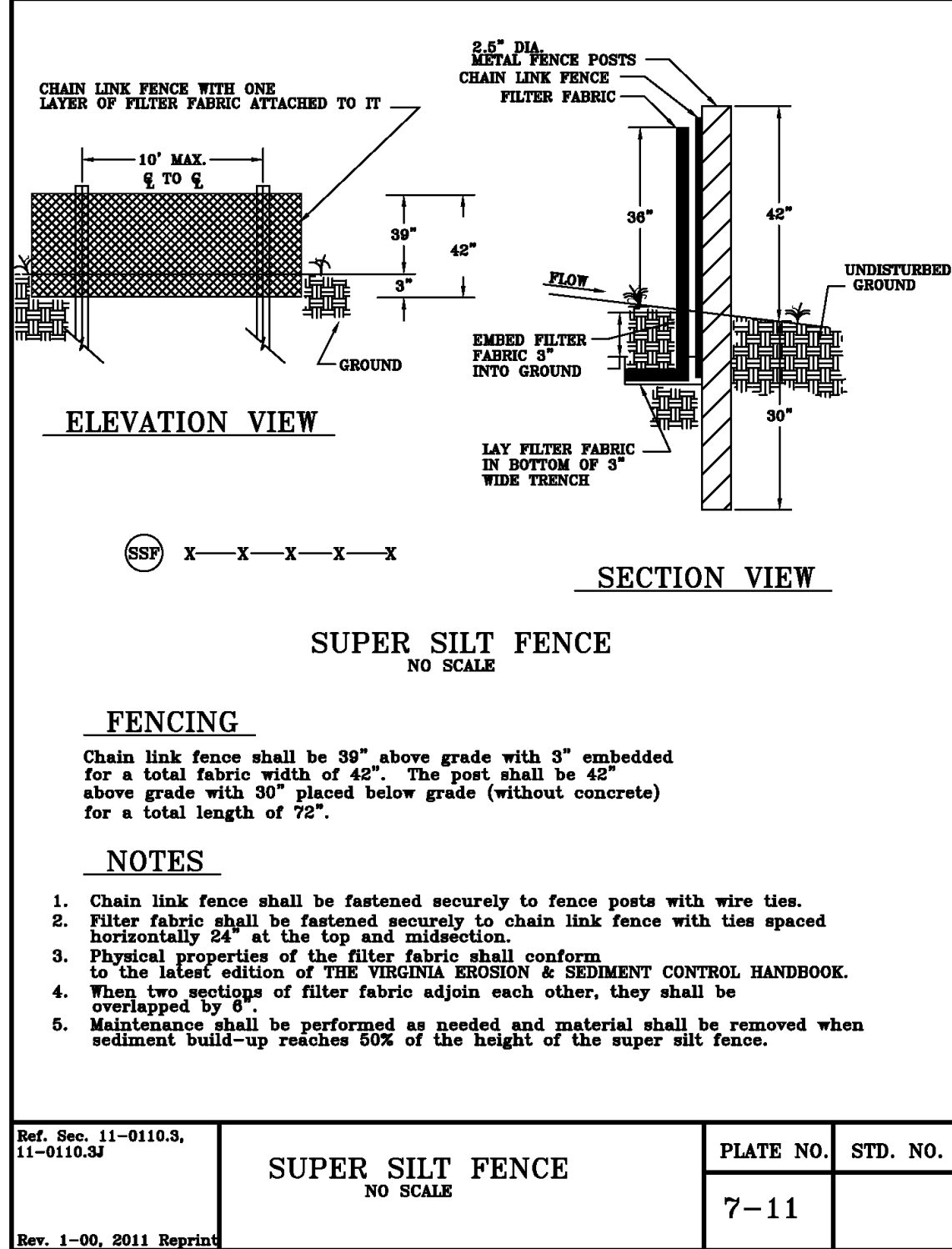
Setting

Landform: Interfluvies

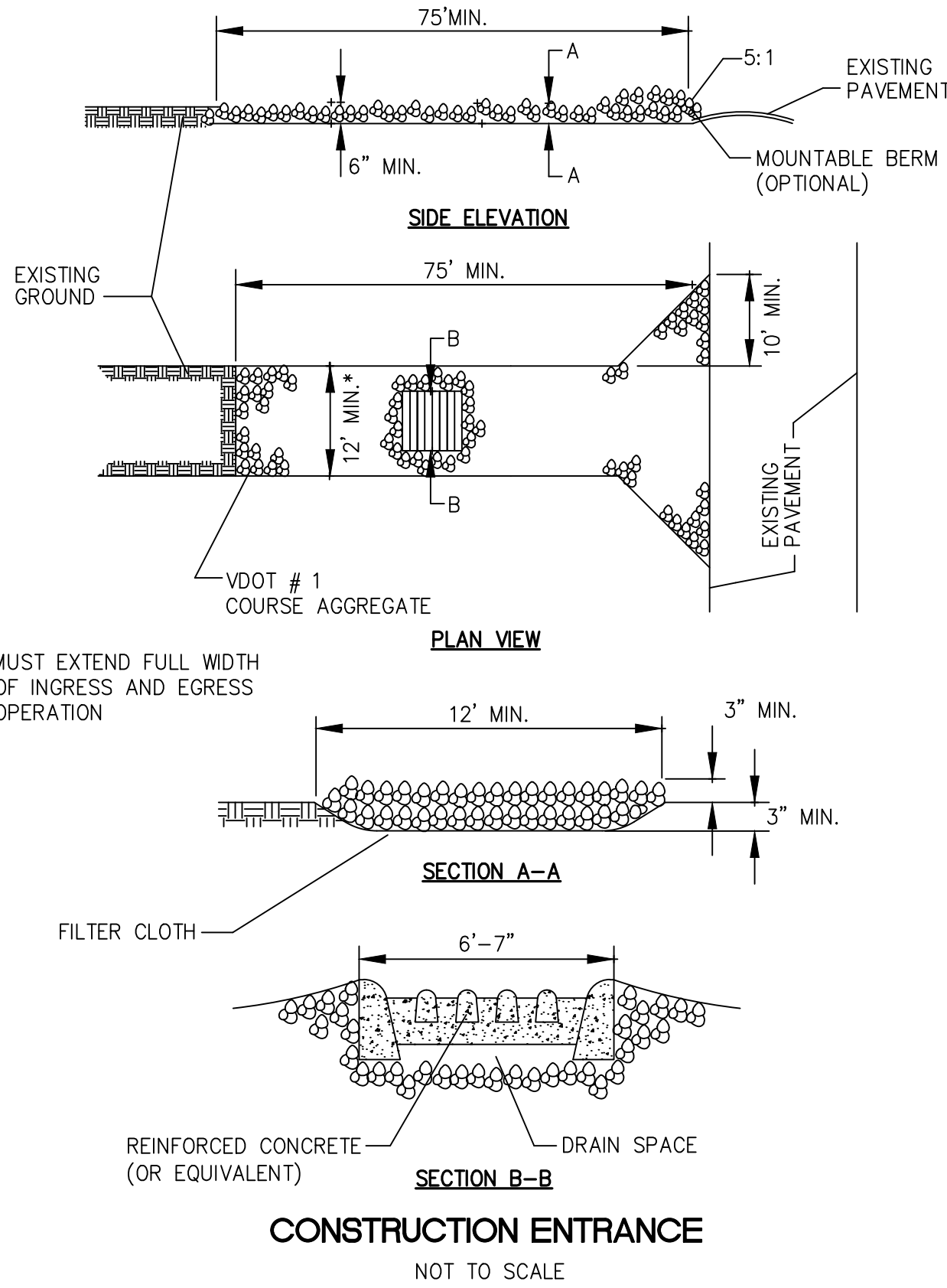
GENERAL EROSION AND SEDIMENT NOTES

- UNLESS OTHERWISE INDICATED ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS EROSION AND SEDIMENT CONTROL REGULATIONS.
- THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO FINAL INSPECTION.
- ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.
- A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
- PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BOTTOM OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.
- THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
- ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
- DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO ON APPROVED FILTERING DEVICE.
- THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
- CONTRACTOR IS TO REMOVE MUD/SWEEP STREET AS NEEDED OR DAILY TO KEEP FREE OF SEDIMENT.

FAIRFAX COUNTY PUBLIC FACILITIES MANUAL



SOURCE: ADAPTED FROM CONWED PLASTICS AND VDOT ROAD AND BRIDGE STANDARDS PLATE 3.01-1



EROSION & SEDIMENT CONTROL NARRATIVES & DETAILS

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

WALTER L. PHILLIPS
INCORPORATED
ESTABLISHED 1945
DATE: 9/12/2017, 11/8/2017, 12/12/2017
SCALE: 1" = 20'

NO.

DESCRIPTION

DATE

REV. BY

APPROVED

REVISION APPROVED BY

NO.

DESCRIPTION

DATE

REV. BY

APPROVED

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

File No. CB-8

Job No. 16-081

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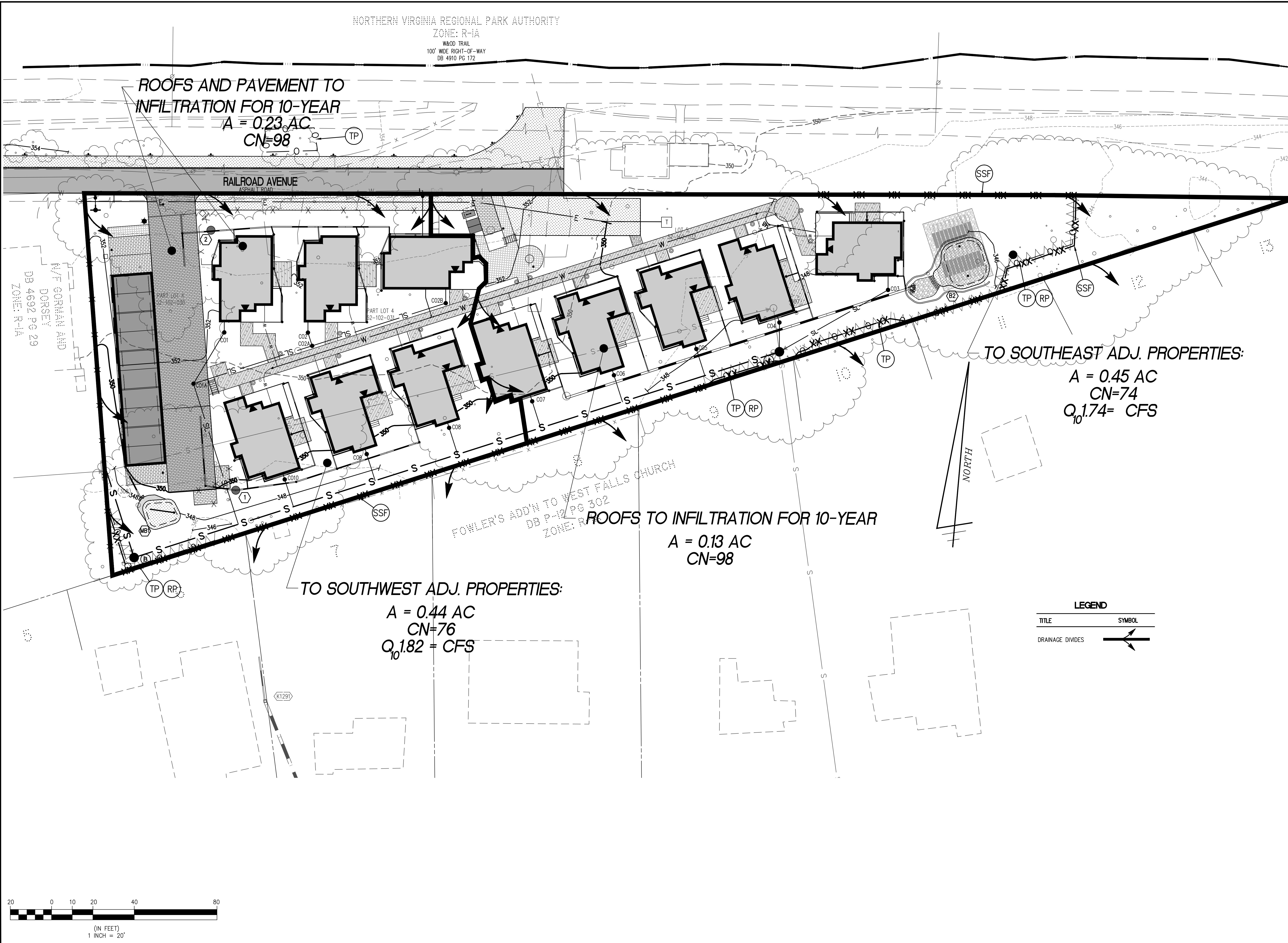
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File No. CB-8

Job No. 16-081

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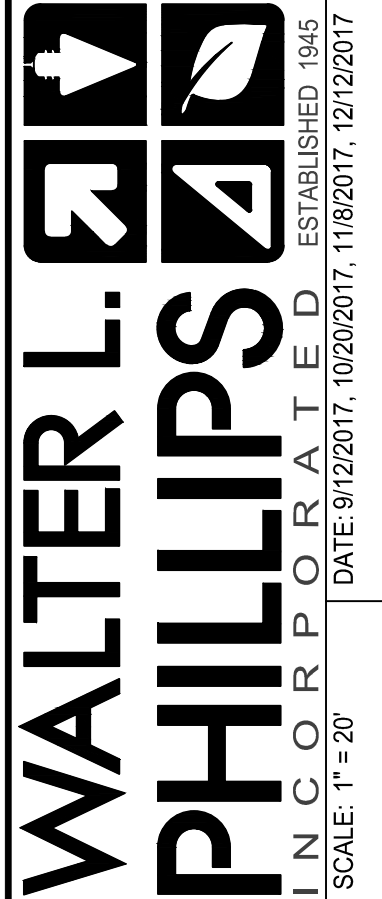


PROPOSED DRAINAGE DIVIDES

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA



NO.	REVISION APPROVED BY		DATE		APPROVED		DATE	
	DESCRIPTION	DATE	REV.	BY				



WALTER L. PHILLIPS
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INCORPORATED ESTABLISHED 1945
DATE: 9/12/2017, 10/20/2017, 11/8/2017, 12/12/2017
SCALE: 1" = 20'
DRAWN: AI
CHECKED: KW

RUNOFF REDUCTION COMPLIANCE SPREADSHEET

DEQ Virginia Runoff Reduction Method Re-Development Compliance Spreadsheet - Version 3.0

2011 BMP Standards and Specifications

2013 Draft BMP Standards and Specifications

Project Name:

RAILROAD AVE.

Date:

10/17/2017

Linear Development Project?

No

CLEAR ALL
(Ctrl+Shift+R)

data input cells

constant values

calculation cells

final results

Site Information

Post-Development Project (Treatment Volume and Loads)

Enter Total Disturbed Area (acres) →

1.25

Maximum reduction required:

20%

The site's net increase in impervious cover (acres) is:

0.407552801

Post-Development TP Load Reduction for Site (lb/yr):

0.81

Check:

2013 Draft Stds & Specs

Linear project?

No

Land cover areas entered correctly?

✓

Total disturbed area entered?

✓

Pre-ReDevelopment Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be			1.22		1.22
Impervious Cover (acres)			0.03		0.03
					1.25

Post-Development Land Cover (acres)

	A Soils	B Soils	C Soils	D Soils	Totals
Forest/Open Space (acres) -- undisturbed, protected forest/open space or reforested					0.00
Managed Turf (acres) -- disturbed, graded for yards or other turf to be			0.81		0.81
Impervious Cover (acres)			0.44		0.44
Area Check	OK.	OK.	OK.	OK.	1.25

Constants

Annual Rainfall (inches)	43
Target Rainfall Event (inches)	1.00
Total Phosphorus (TP) EMC (mg/L)	0.26
Total Nitrogen (TN) EMC (mg/L)	1.86
Target TP Load (lb/acre/yr)	0.41
Pj (unitless correction factor)	0.90

Runoff Coefficients (Rv)

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space	0.02	0.03	0.04	0.05
Managed Turf	0.15	0.20	0.22	0.25
Impervious Cover	0.95	0.95	0.95	0.95

LAND COVER SUMMARY -- PRE-REDEVELOPMENT

Land Cover Summary-Pre		
Pre-ReDevelopment	Listed	Adjusted ¹
Forest/Open Space Cover (acres)	0.00	0.00
Weighted Rv(forest)	0.00	0.00
% Forest	0%	0%
Managed Turf Cover (acres)	1.22	0.81
Weighted Rv(turf)	0.22	0.22
% Managed Turf	97%	96%
Impervious Cover (acres)	0.03	0.03
Rv(impervious)	0.95	0.95
% Impervious	3%	4%
Total Site Area (acres)	1.25	0.84
Site Rv	0.24	0.25

Treatment Volume and Nutrient Load

Pre-ReDevelopment Treatment Volume (acre-ft)	0.0250	0.0175
Pre-ReDevelopment Treatment Volume (cubic feet)	1,088	762
Pre-ReDevelopment TP Load (lb/yr)	0.68	0.48
Pre-ReDevelopment TP Load per acre (lb/acre/yr)	0.55	0.57
Baseline TP Load (lb/yr) (0.41 lbs/acre/yr applied to pre-redevelopment area excluding pervious land proposed for new impervious cover)		0.35

LAND COVER SUMMARY -- POST DEVELOPMENT

Land Cover Summary-Post (Final)		
Post ReDev. & New Impervious		
Forest/Open Space Cover (acres)	0.00	
Weighted Rv(forest)	0.00	
% Forest	0%	
Managed Turf Cover (acres)	0.81	
Weighted Rv (turf)	0.22	
% Managed Turf	65%	
Impervious Cover (acres)	0.44	
Rv(impervious)	0.95	
% Impervious	35%	
Final Site Area (acres)	1.25	
Final Post Dev Site Rv	0.48	

Treatment Volume and Nutrient Load

Final Post-Development Treatment Volume (acre-ft)	0.0498	Post-Development Treatment Volume (acre-ft)	0.0323
Final Post-Development Treatment Volume (cubic feet)	2,168	Post-Development Treatment Volume (cubic feet)	1,405
Final Post-Development TP Load (lb/yr)	1.36	Post-Development TP Load (lb/yr)	0.88
Final Post-Development TP Load per acre (lb/acre/yr)	1.09		
Max. Reduction Required (Below Pre-ReDevelopment Load)	20%		
TP Load Reduction Required for Redeveloped Area (lb/yr)	0.10	TP Load Reduction Required for New Impervious Area (lb/yr)	0.72

Post-Development Requirement for Site Area

TP Load Reduction Required (lb/yr)	0.81
------------------------------------	------

Nitrogen Loads (Informational Purposes Only)

Pre-ReDevelopment TN Load (lb/yr)	4.89	Final Post-Development TN Load (Post-ReDevelopment & New Impervious) (lb/yr)	9.74
-----------------------------------	------	--	------

Adjusted Land Cover Summary:
Pre-ReDevelopment land cover minus pervious land cover (forest/open space or managed turf) acreage proposed for new impervious cover.

Adjusted total acreage is consistent with Post-ReDevelopment acreage (minus acreage of new impervious cover).

Column I shows load reduction requirement for new impervious cover (based on new development load limit, 0.41 lbs/acre/yr).

Site Results (Water Quality Compliance)

Area Checks

	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	AREA CHECK
FOREST/OPEN SPACE (ac)	0.00	0.00	0.00	0.00	0.00	OK.
IMPERVIOUS COVER (ac)	0.29	0.15	0.00	0.00	0.00	OK.
IMPERVIOUS COVER TREATED (ac)	0.29	0.15	0.00	0.00	0.00	OK.
MANAGED TURF AREA (ac)	0.38	0.43	0.00	0.00	0.00	OK.
MANAGED TURF AREA TREATED (ac)	0.00	0.00	0.00	0.00	0.00	OK.
AREA CHECK	OK.	OK.	OK.	OK.	OK.	

Site Treatment Volume (ft³)

2,168

Runoff Reduction Volume and TP By Drainage Area

	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E	TOTAL
RUNOFF REDUCTION VOLUME ACHIEVED (ft ³)	631	406	0	0	0	1,037
TP LOAD AVAILABLE FOR REMOVAL (lb/yr)	0.82	0.54	0.00	0.00	0.00	1.36
TP LOAD REDUCTION ACHIEVED (lb/yr)	0.46	0.29	0.00	0.00	0.00	0.75
TP LOAD REMAINING (lb/yr)	0.36	0.25	0.00	0.00	0.00	0.62
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	3.18	2.08	0.00	0.00	0.00	5.27
Total Phosphorus						
FINAL POST-DEVELOPMENT TP LOAD (lb/yr)	1.36					
TP LOAD REDUCTION REQUIRED (lb/yr)	0.81					
TP LOAD REDUCTION ACHIEVED (lb/yr)	0.75					
TP LOAD REMAINING (lb/yr):	0.62					
REMAINING TP LOAD REDUCTION REQUIRED (lb/yr):	0.07					
Total Nitrogen (For Information Purposes)						
POST-DEVELOPMENT LOAD (lb/yr)	9.74					
NITROGEN LOAD REDUCTION ACHIEVED (lb/yr)	5.27					
REMAINING POST-DEVELOPMENT NITROGEN LOAD (lb/yr)	4.48					

Runoff Volume and Curve Number Calculations

Enter design storm rainfall depths (in):

1-year storm	2-year storm	10-year storm
2.64	3.19	4.90

Use NOAA Atlas 14 (<http://hdsc.nws.noaa.gov/hdsc/pfds/>)

*Notes (see below):

[1] The curve numbers and runoff volumes computed in this spreadsheet for each drainage area are limited in their applicability for determining and demonstrating compliance with water quantity requirements. See VRRM User's Guide and Documentation for additional information.

[2] Runoff Volume (RV) for pre- and post-development drainage areas must be in volumetric units (e.g., acre-feet or cubic feet) when using the Energy Balance Equation. Runoff measured in watershed-inches and shown in the spreadsheet as RV(watershed-inch) can only be used in the Energy Balance Equation when the pre- and post-development drainage areas are equal. Otherwise RV(watershed-inch) must be multiplied by the drainage area.

[3] Adjusted CNs are based on runoff reduction volumes as calculated in D.A. tabs. An alternative CN adjustment calculation for Vegetated Roofs is included in BMP specification No. 5.

Drainage Area Curve Numbers and Runoff Depths*

Curve numbers (CN, CNadj) and runoff depths (RV_{Developed}) are computed with and without reduction practices.

Drainage Area A

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.38	0.00
Impervious Cover	0.00	0.00	0.29	0.00

CN_(D.A. A)

85

RV_{Developed} (watershed-inch) with no Runoff Reduction*

1.29

RV_{Developed} (watershed-inch) with Runoff Reduction*

1.03

Adjusted CN*

81

*See Notes above

Drainage Area B

	A Soils	B Soils	C Soils	D Soils
Forest/Open Space -- undisturbed, protected forest/open space or reforested land	0.00	0.00	0.00	0.00
Managed Turf -- disturbed, graded for yards or other turf to be mowed/managed	0.00	0.00	0.43	0.00
Impervious Cover	0.00	0.00	0.15	0.00

CN_(D.A. B)

80

RV_{Developed} (watershed-inch) with no Runoff Reduction*

0.99

RV_{Developed} (watershed-inch) with Runoff Reduction*

0.79

Adjusted CN*

76

*See Notes above

Total Area (acres):

0.67

Runoff Reduction Volume (ft³):

631

Total Area (acres):

0.58

Runoff Reduction Volume (ft³):

406

File No. CB-8 Tax Map No. Job No. 16-081 Cadd Dwg. File: Q:\sdskpro\16081\dwg\Engineering\Site Plan\16081C-0702.dwg Xref:

SHEET: C-0702

RUNOFF REDUCTION COMPLIANCE SPREADSHEET

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com

WALTER L. PHILLIPS

INCORPORATED
ESTABLISHED 1945
DATE: 9/12/2017, 11/8/2017, 12/12/2017
SCALE: NONE
DRAWN: AL
CHECKED: KW

REVISION APPROVED BY

NO.	DESCRIPTION	DATE	REV. BY	APPROVED

RAILROAD COTTAGES

CITY OF FALLS CHURCH, VIRGINIA

Drainage Area A

CLEAR BMP AREAS

Total Phosphorus Available for Removal in D.A. A (lb/yr)	0.82
Post Development Treatment Volume in D.A. A (ft³)	1,310

--Select from dropdown lists--

Nitrogen Removal Efficiency (%)	Nitrogen Load from Upstream Practices (lbs)	Untreated Nitrogen Load to Practice (lbs)	Nitrogen Removed By Practice (lbs)	Remaining Nitrogen Load (lbs)
3. Permeable Pavement (RR)				
25	0.00	0.00	0.00	0.00
25		1.46	1.19	0.27
6. Bioretention (RR)				
40	0.00	0.00	0.00	0.00
60	0.00	0.66	0.61	0.05
7. Infiltration (RR)				
15	0.00	2.41	1.39	1.03
15	0.00	0.00	0.00	0.00

CLEAR BMP AREAS



Total Phosphorus Available for Removal in D.A. B (lb/yr)	0.54
Post Development Treatment Volume in D.A. B (ft³)	858

--Select from dropdown lists--

Nitrogen Removal Efficiency (%)	Nitrogen Load from Upstream Practices (lbs)	Untreated Nitrogen Load to Practice (lbs)	Nitrogen Removed By Practice (lbs)	Remaining Nitrogen Load (lbs)
3. Permeable Pavement (RR)				
25	0.00	0.00	0.00	0.00
25		0.31	0.25	0.06
6. Bioretention (RR)				
40	0.00	0.00	0.00	0.00
60	0.00	1.99	1.83	0.16

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

[illegible]

WALTER L. PHILLIPS		 		Engineers • Surveyors • Planners Landscape Architects • Arborists 207 PARK AVENUE FALLS CHURCH, VIRGINIA 22046 (703) 532-6163 Fax (703) 533-1301 www.WLPH.com
INCORPORATED		ESTABLISHED 1945		
SCALE: NONE	DATE: 9/12/2017	DRAWN:	CHECKED:	
	11/6/2017			12/12/2017

SHEET: C-0703

WATER QUANTITY BALANCE EQUATIONS

1 YR STORMWATER COMPUTATIONS BALANCE EQUATION	
$Q_{developed} \leq I.F. * (Q_{pre-developed} * R_{Vpre-developed}) / R_{Vdeveloped}$	
I.F. = 0.9 (less than 1 acre) I.F. = 0.8 (greater than 1 acre)	
$Q_{developed} = Q_{undetained}(1.098\text{ CFS}) + Q_{detained}(0\text{ CFS}) =$	1.098 CFS
$I.F. * (Q_{pre-developed} * R_{Vpre-developed}) / R_{Vdeveloped} =$	
$(R_{Vdeveloped} = R_{Vundetained} + R_{Vdetained})$	
$0.8 * (1.543 * 3122) / 2223 =$	1.734 CFS
	1.098 CFS < 1.734 CFS

10 YR STORMWATER COMPUTATIONS	
$Q_{developed}(\text{detained} + \text{undetained}) \leq Q_{pre-developed}$	
$0\text{ CFS}(\text{detained}) + 3.55\text{ CFS}(\text{undetained}) = 3.55\text{ CFS}$	
3.55 CFS < 4.99 CFS pre-development	

OUTFALL NARRATIVE

UNDER EXISTING CONDITIONS, APPROXIMATELY HALF OF THE MOSTLY PERVIOUS SITE OUTFALLS TO THE SOUTHWEST ADJACENT PROPERTIES BY SURFACE RUNOFF, AND THE OTHER HALF OF THE SITE OUTFALLS TO THE SOUTHEAST ADJACENT PROPERTIES BY SURFACE RUNOFF. THE OUTFALL PATHS RUN INTO PARKER BRANCH AND PEARSON BRANCH AND EVENTUALLY OUTFALL TO TRIPPS RUN.

THE REDEVELOPMENT OF THIS SITE WILL RESULT IN AN INCREASE OF IMPERVIOUS AREA. HOWEVER, WITH THE BMP MEASURES PROPOSED TO SEND UNITS 1, 2, 7, 8, 9, 10, AND THE COMMON HOUSE TO INFILTRATION, TO SEND THE CARPORT ROOF TO A MICRO-BIORETENTION BASIN, TO SEND UNITS 3-6 TO A BIORETENTION BASIN, AND TO PROPOSE PERMEABLE PAVEMENT FOR ALL VEHICULAR AND PATIO AREAS, RUNOFF REDUCTION WILL BE ACHIEVED AS DEMONSTRATED IN THE VRRM WORKSHEET ON SHEET C-0702. ADDITIONALLY, STORAGE IS PROVIDED BENEATH THE PERMEABLE PAVEMENT DRIVEWAY AND BENEATH THE BIORETENTION BASIN #2, SIZED TO CAPTURE AND INFILTRATE THE 10-YEAR STORM THAT OUTFALLS TO EACH FACILITY. SEE SHEETS C-0705 AND C-0706 FOR THE SIZING. BECAUSE THE RUNOFF TO THESE FACILITIES INFILTRATE INTO THE GROUND WITHIN THE 48-HOUR ALLOWABLE DRAWDOWN PERIOD, THE RUNOFF IS DISCOUNTED FROM LEAVING THE SITE - SEE DRAINAGE DIVIDES ON SHEET C-0701.

WATER QUALITY:
WATER QUALITY REQUIREMENTS ARE PROPOSED TO BE MET THROUGH TREATMENT OF ALL IMPERVIOUS AREAS. ROOF AREAS ARE TREATED WITH INFILTRATION AND BIORETENTION, AND VEHICULAR AREA AND PATIOS ARE TREATED WITH PERMEABLE PAVEMENT. SEE DISTRIBUTION OF TREATMENT ON SHEET C-0705. A REMAINING PHOSPHORUS REMOVAL REQUIREMENT OF 0.07 LBS WILL BE MET THROUGH NUTRIENT CREDIT PURCHASE.

WATER QUANTITY
AS DEMONSTRATED BY THE WATER QUANTITY BALANCE EQUATIONS ABOVE, BOTH THE 1-YEAR AND 10-YEAR STORMS ARE REDUCED FROM EXISTING CONDITIONS (WHICH IS ALMOST ALL PERVIOUS AREA) TO PROPOSED CONDITIONS, BY INFILTRATING THE 10-YEAR STORM ONSITE. AS REQUIRED BY THE COTTAGE DEVELOPMENT ORDINANCE SECTION 48-241(8), THE FIRST INCH OF RAINFALL SHALL BE CAPTURED AND RETAINED ONSITE FROM ROOF AND PARKING AREAS. SEE BELOW FOR CALCULATION OF VOLUME OF FIRST INCH OF RAINFALL FROM ROOF AND PARKING AREAS, AND STORAGE PROVIDED. SINCE THE SITE PROPOSES TO RETAIN AND INFILTRATE THE 10-YEAR STORM, THE STORAGE PROVIDED EXCEEDS THE FIRST INCH OF RAINFALL.

DUE TO THE RESULTS OF THIS ANALYSIS AND THE FACT THAT THE PROJECT WILL RESULT IN THE REDUCTION OF RUNOFF FROM THE SITE FROM EXISTING CONDITIONS, IT IS THE OPINION OF THE SUBMITTING ENGINEER THAT THIS OUTFALL IS ADEQUATE, AND THAT IMPACT ONTO THE ADJACENT PROPERTIES ARE IMPROVED FROM EXISTING CONDITIONS BY REDUCING RUNOFF ONTO THEIR SITES.

SITE VOLUME RETENTION CALCULATION	
ROOF AREAS	14,261 SF
VEHICULAR AREAS	4,036 SF
TOTAL AREA	18,297 SF
1" RAINFALL	0.0833 SF
TOTAL VOLUME TO BE RETAINED	1,525 CF
STORAGE VOLUME PROVIDED	3,599 CF
	3599 CF > 1524.75 CF

SEE SHEETS C-0705 AND C-0706 FOR STORAGE PROVIDED.



Date: April 21, 2017

To: Railroad, LLC
c/o The Young Group, Inc.
800 West Broad Street, #333
Falls Church, VA 22046

From: Claire Wolanski
Credit Sales Coordinator
Resource Environmental Solutions

Subject: Potomac Watershed – Nutrient Credit Pricing

Project Reference: Railroad Cottages, Falls Church, HUC 02070010

This letter is to confirm the pricing of Nutrient Credits to be sold and debited from one or more of Resource Environmental Solutions, LLC's nutrient bank facilities within the above-referenced watersheds. Upon approval and release by DEQ, all such Nutrient Credits may be used by permit applicants within these watersheds to compensate for nutrient loadings in excess of state or local regulations, as per Virginia Code § 62.1-44.15:35 and § 62.1-44.19:14 and Virginia Administrative Code 9 VAC 25-820-10 et seq. We appreciate the opportunity to assist you with your project. Currently our Nutrient Credit price for your project is as follows:

- 0.07 pounds of Phosphorus Credits = \$2,750.00

This pricing is good for 60 days as of the date of this correspondence.

Please feel free to contact me if you have any questions.

Sincerely,

Claire Wolanski

Claire E. Wolanski
Resource Environmental Solutions
804-591-4060

10055 Red Run Blvd.
Suite 130
Owings Mills, MD
21117

412 N. 4th St.
Suite 300
Baton Rouge, LA
70802

701 E. Bay St.
Suite 306
Charleston, SC
29403

5020 Montrose Blvd.
Suite 650
Houston, TX
77006

1200 Camella Blvd.
Suite 220
Lafayette, LA
70508

1371½ East Main St.
Suite 210
Oak Hill, WV
25901

33 Terminal Way
Suite 431
Pittsburgh, PA
15219

302 Jefferson St.
Suite 110
Raleigh, NC
27605

1521 W. Main
2nd Floor
Richmond, VA
23220

HYDROGRAPHS

Hydrograph Report

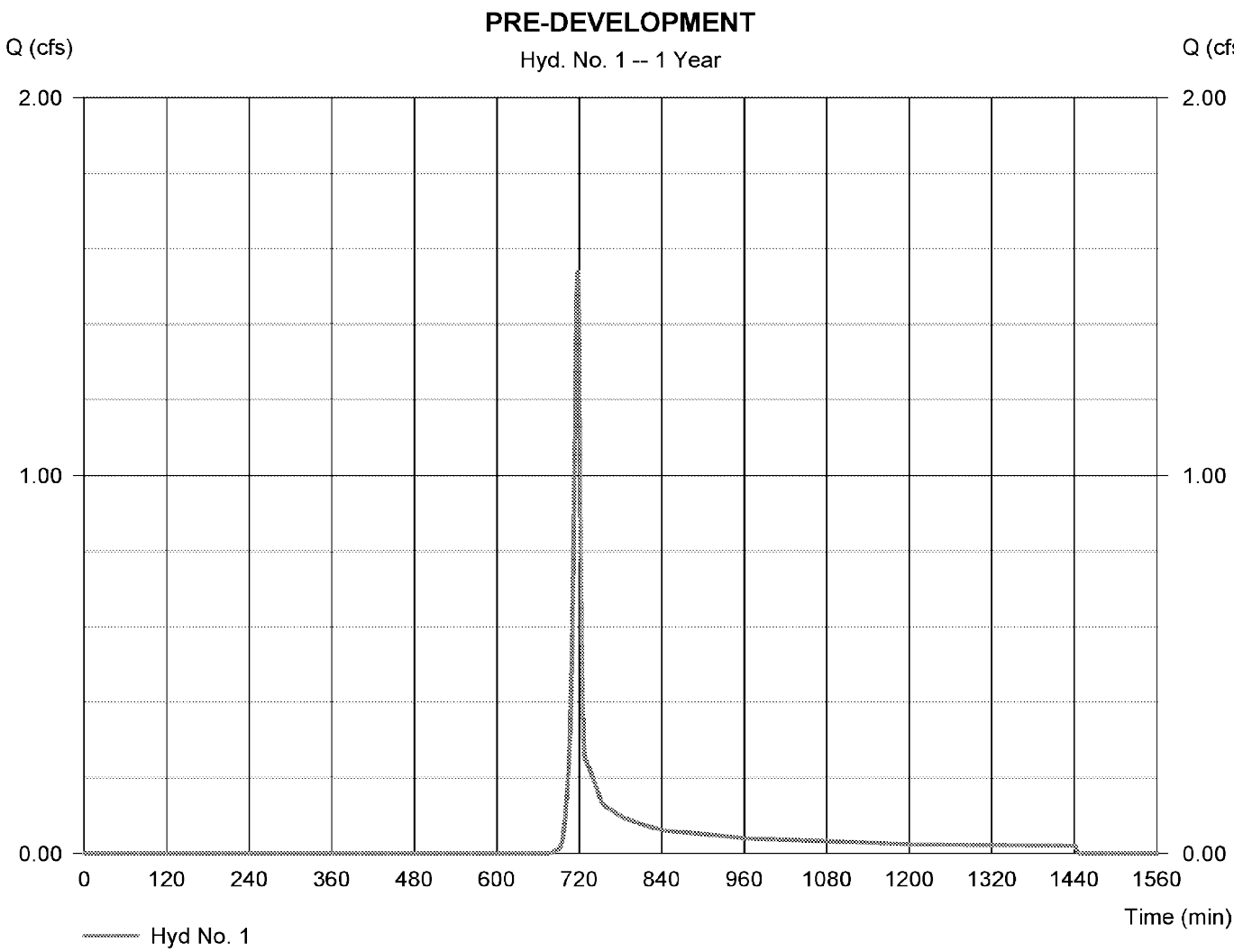
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Wednesday, 04 / 19 / 2017

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	= SCS Runoff	Peak discharge	= 1.543 cfs
Storm frequency	= 1 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 3,122 cuft
Drainage area	= 1.250 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

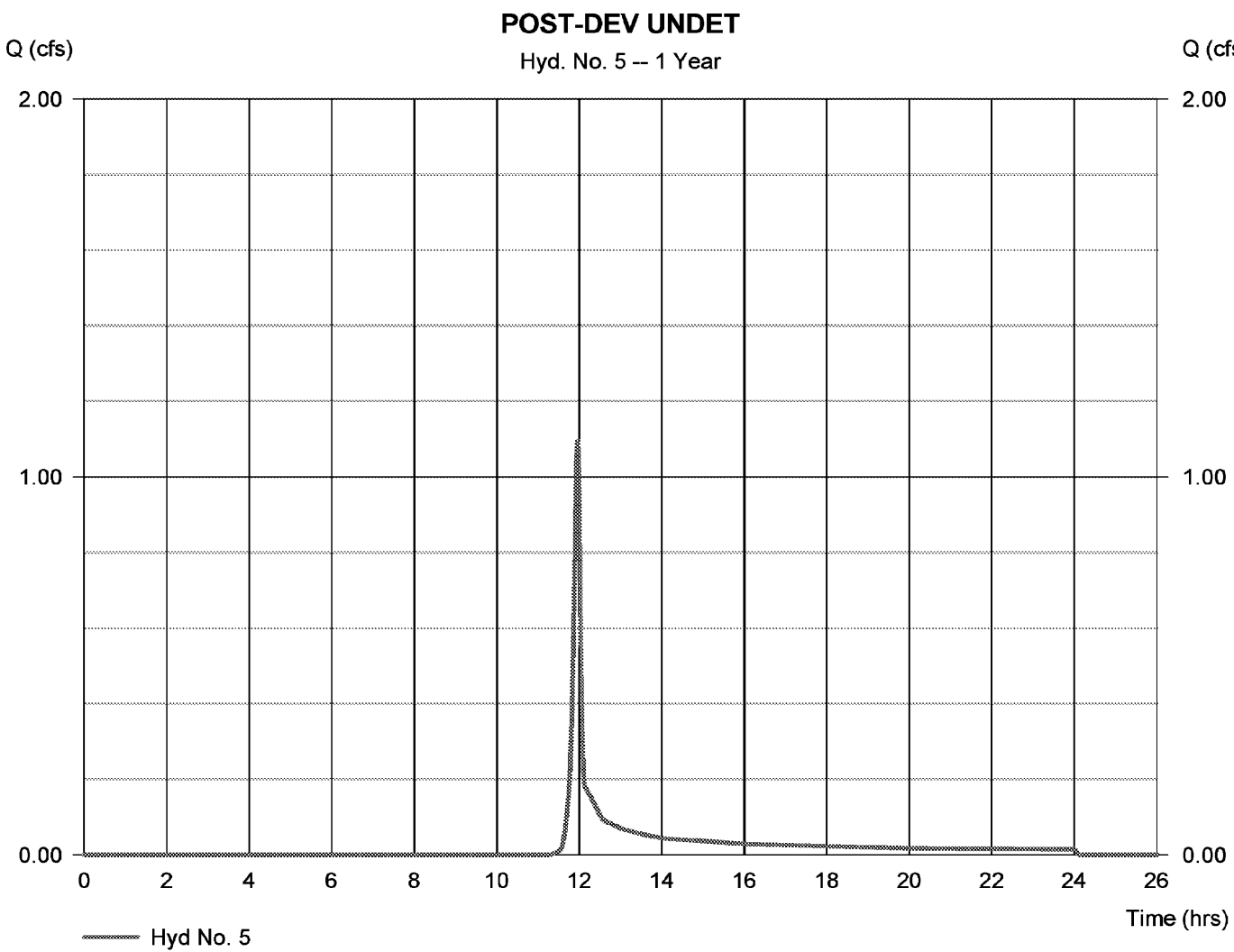
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Wednesday, 04 / 19 / 2017

Hyd. No. 5

POST-DEV UNDET

Hydrograph type	= SCS Runoff	Peak discharge	= 1.098 cfs
Storm frequency	= 1 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 2,223 cuft
Drainage area	= 0.890 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

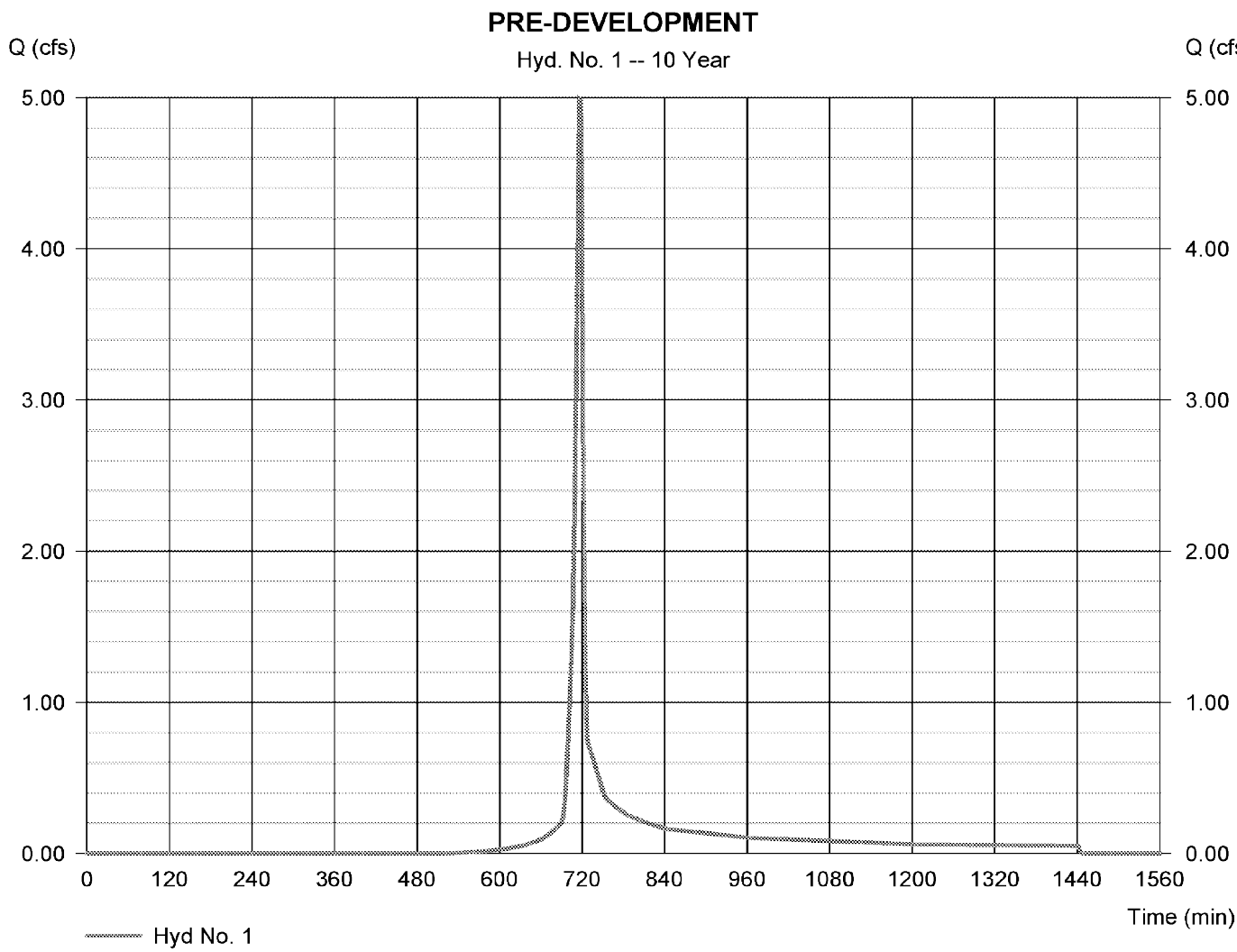
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Wednesday, 04 / 19 / 2017

Hyd. No. 1

PRE-DEVELOPMENT

Hydrograph type	= SCS Runoff	Peak discharge	= 4.990 cfs
Storm frequency	= 10 yrs	Time to peak	= 718 min
Time interval	= 2 min	Hyd. volume	= 10,075 cuft
Drainage area	= 1.250 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

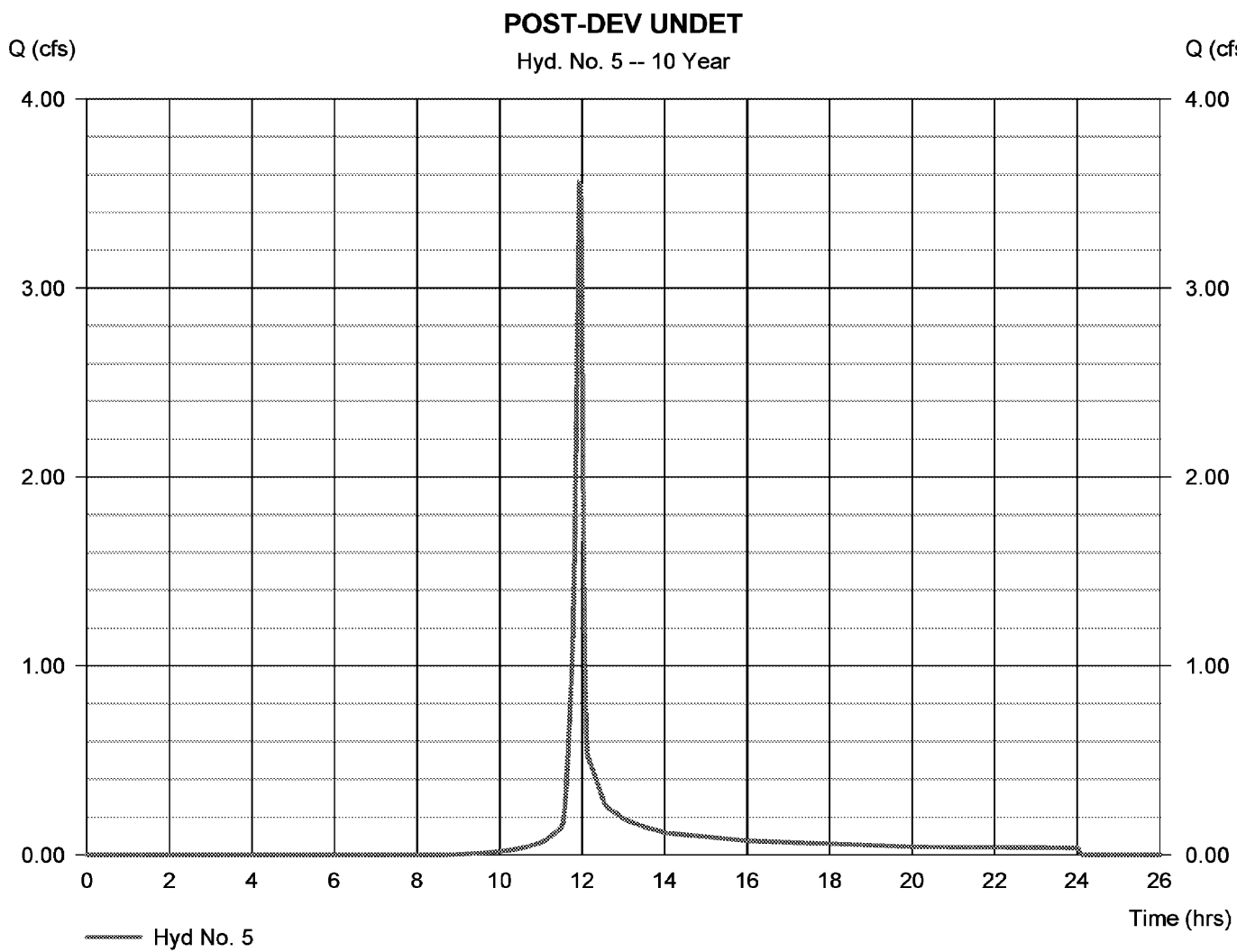
Hydroflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.5

Wednesday, 04 / 19 / 2017

Hyd. No. 5

POST-DEV UNDET

Hydrograph type	= SCS Runoff	Peak discharge	= 3.553 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 7,173 cuft
Drainage area	= 0.890 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



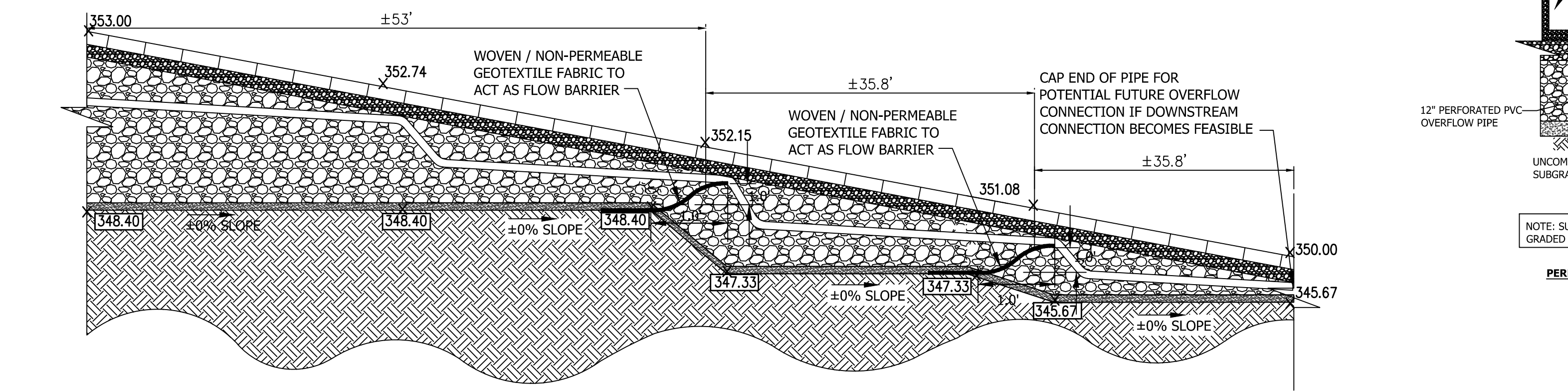
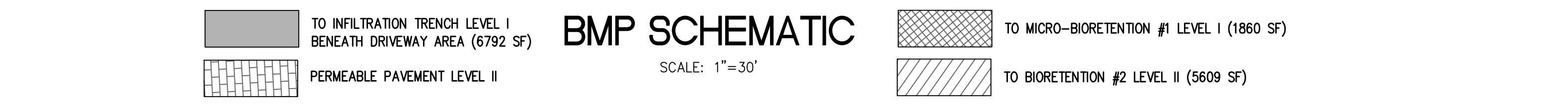
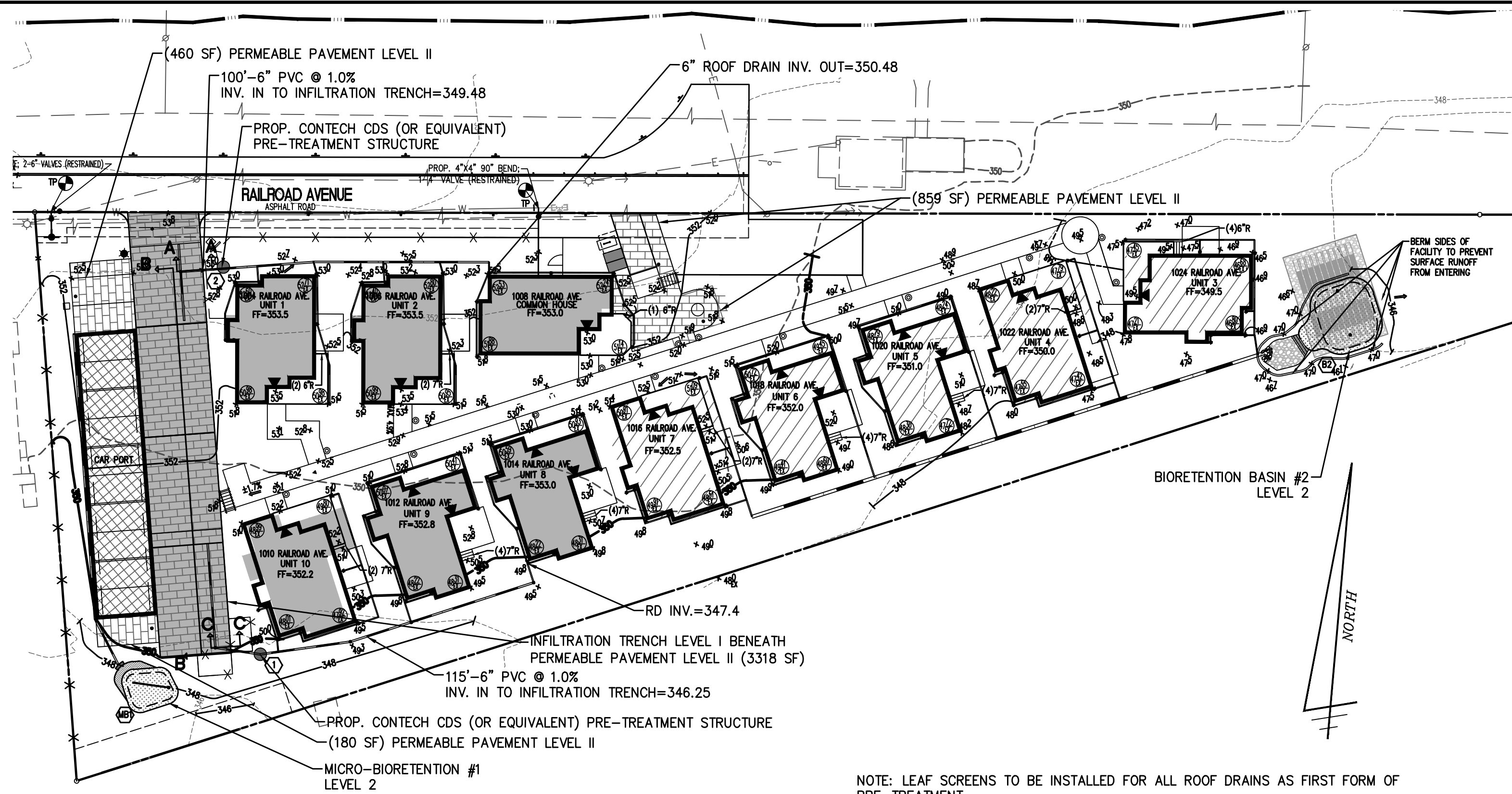
HYDROGRAPHS & OUTFALL NARRATIVE

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INCORPORATED
ESTABLISHED 1945
DATE: 9/12/2017, 11/8/2017, 12/12/2017
SCALE: NONE

NO.	DESCRIPTION	DATE	REV.	BY	APPROVED

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA



NOTES:
1. LAY WOVEN / NON-PERMEABLE GEOTEXTILE FABRIC TO 12" HEIGHT OF HIGH SIDE STONE SECTION.
2. EXTEND 12" IN BOTH DIRECTIONS TO HOLD IN PLACE.

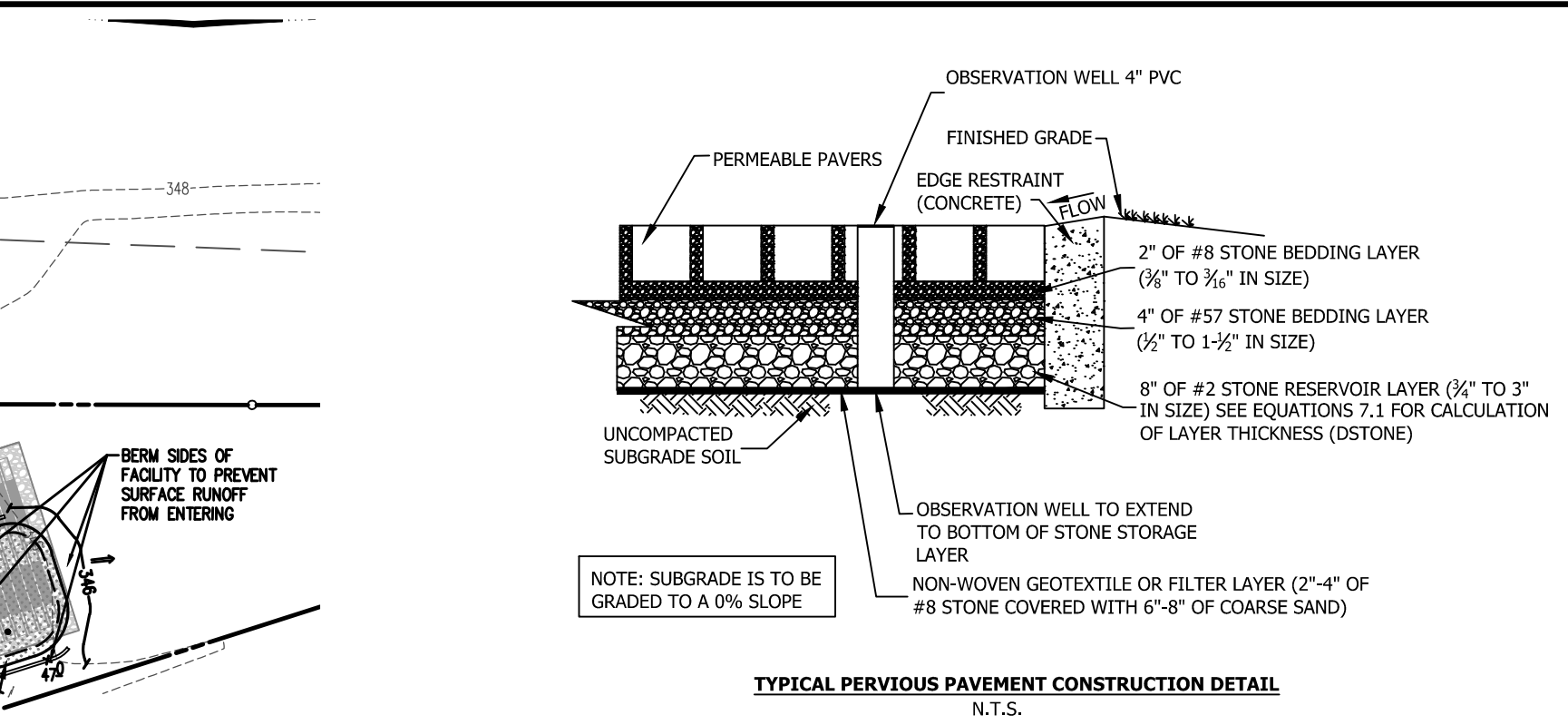
SECTION B-B
PERMEABLE PAVEMENT WITH INFILTRATION TRENCH GRAVEL FLOW BARRIER DETAIL
(FOR STEP DOWN INSTALLATION)
N.T.S.

INFILTRATION STORAGE VOLUME CALCULATION

DRAINAGE AREA 'A' GRAVEL INFILTRATION VOLUME CALCULATION	
AREA TO INFILTRATION FROM ROOFS	6792 SF
AREA TO INFILTRATION FROM PP DRIVEWAY	3318 SF
10-YEAR RV FROM VRRM	3.02 IN
TOTAL 10-YR RUNOFF VOLUME	2418 CF
DRAWDOWN TIME CALCULATION:	
INFILTRATION RATE	0.5 IN/HR
DESIGN RATE	0.25 IN/HR
INFILTRATION SURFACE AREA	3318 SF
DRAWDOWN TIME	1.46 DAYS
STORAGE VOLUME PROVIDED:	
SURFACE AREA	3318 SF
DEPTH OF GRAVEL	1.83 FT
GRAVEL VOID RATIO	0.4
TOTAL VOLUME	2432 CF
2432 CF > 2418 CF	
PROVIDE MIN. 1.83' (22") OF GRAVEL FOR STORAGE VOLUME.	

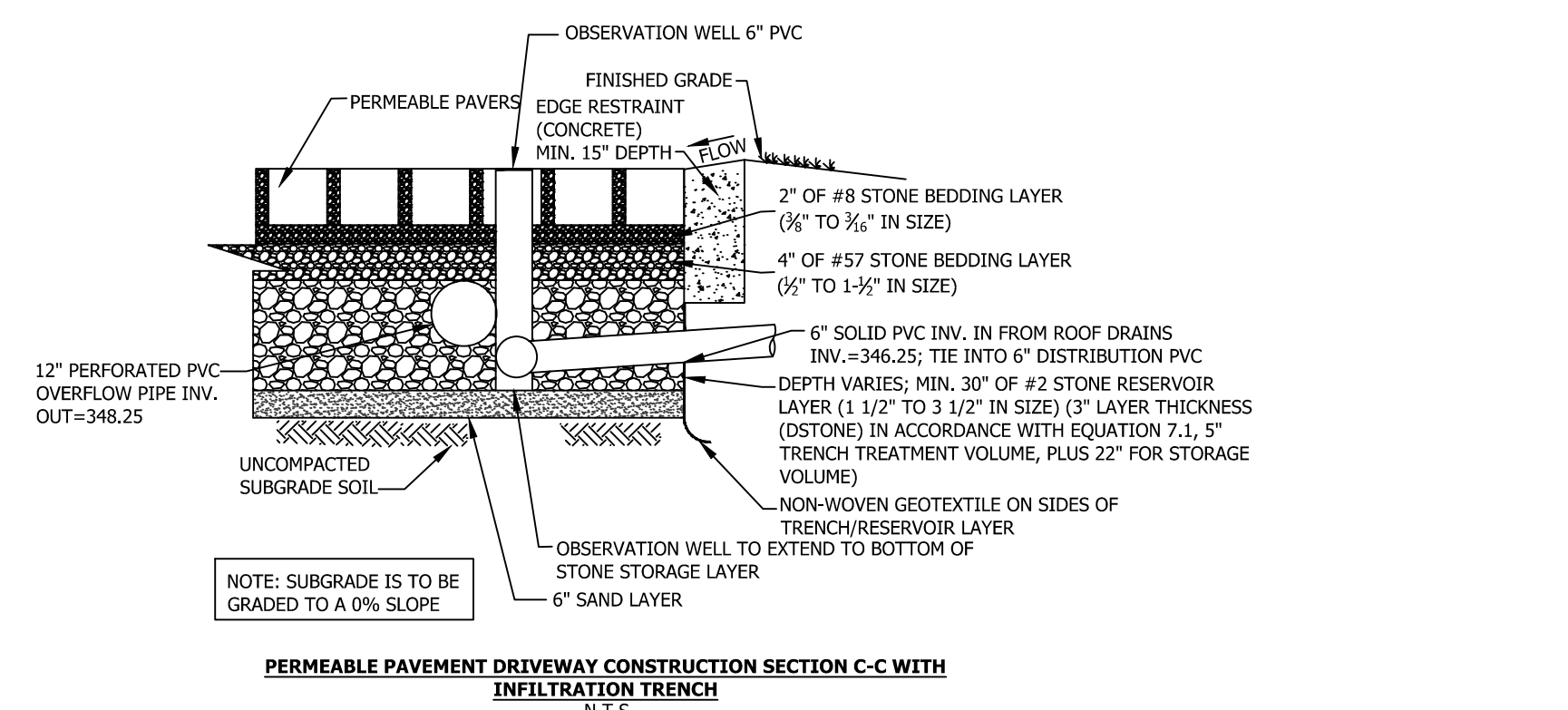
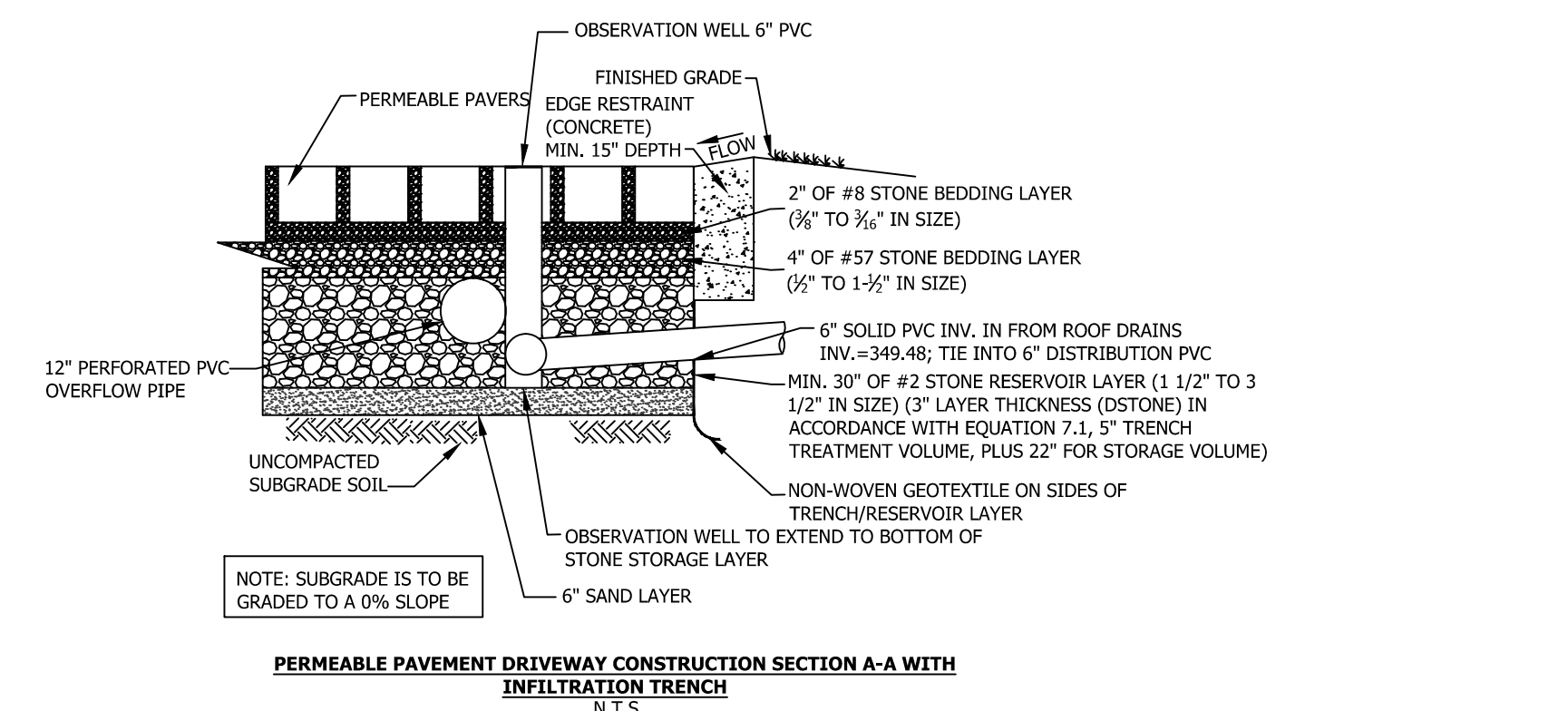
INFILTRATION TREATMENT VOLUME CALCULATION

INFILTRATION TRENCH:	
DESIGN BASIS: LEVEL 1 DESIGN	
MEASURED RATE: 0.50 IN/HR	
DESIGN RATE: 0.25 IN/HR OR 0.50 FT/DAY	
HSG B	
DRAINAGE AREA	SF
PERVIOUS AREA	0.20
IMPERVIOUS AREA	6789
MINIMUM REQUIRED $T_v = \frac{(1.0 \times R_v \times A)}{12}$	
$= \frac{1.0 [0.95(6789)]}{12}$	
$= 537 \text{ CF}$	
SURFACE AREA PROVIDED = 3318 SF	
GRAVEL STORAGE DEPTH FOR $T_v = 5"$	
WATER STORED/TREATED IN FILTER MEDIA AND GRAVEL STORAGE LAYERS	
EQUIVALENT STORAGE DEPTH = $(0.416)(0.4) = 0.1664'$	
TOTAL VOLUME OF STORAGE PROVIDED	
$VOLUME = (3318 \text{ SF})(0.1664')$	
$= 552 \text{ CF} > \text{TREATMENT VOLUME (537 CF)}$	
PROVIDE MIN. 5" OF GRAVEL FOR TRENCH TREATMENT VOLUME.	



PERMEABLE PAVEMENT LEVEL II RESERVOIR CALCULATION

FOR THE PERMEABLE PAVEMENT PARKING SPACES AND PATIOS/WALKS.
PER EQUATION 7.1 OF THE VA DEQ STORMWATER DESIGN SPECIFICATION
 $d(\text{stone}) = \frac{(P \times A_p)}{n(r) \times A_p}$
WHERE:
 $d(\text{stone})$ = DEPTH OF THE STONE RESERVOIR LAYER (FT.)
 P = THE RAINFALL DEPTH (IN FEET) FOR THE TREATMENT VOLUME (LEVEL II = 1.1 INCH (0.09 FT))
 $n(r)$ = POROSITY OF RESERVOIR LAYER (0.4)
 $d(\text{stone}) = \frac{(0.09 \times 1474 \text{ SF})}{0.40 \times 1474 \text{ SF}}$
 $d(\text{stone}) = 0.20$; MINIMUM 3" REQUIRED, 8" PROVIDED



PERMEABLE PAVEMENT TREATMENT VOLUME CALCULATION

FOR THE PERMEABLE PAVEMENT DRIVEWAY WITH INFILTRATION AND STORAGE BENEATH
PER EQUATION 7.1 OF THE VA DEQ STORMWATER DESIGN SPECIFICATION
 $d(\text{stone}) = \frac{(P \times A_p)}{n(r) \times A_p}$
WHERE:
 $d(\text{stone})$ = DEPTH OF THE STONE RESERVOIR LAYER (FT.)
 P = THE RAINFALL DEPTH (IN FEET) FOR THE TREATMENT VOLUME (LEVEL II = 1.1 INCH (0.09 FT))
 $n(r)$ = POROSITY OF RESERVOIR LAYER (0.4)
 $d(\text{stone}) = \frac{(0.09 \times 3318 \text{ SF})}{0.40 \times 3318 \text{ SF}}$
 $d(\text{stone}) = 0.20$; MINIMUM 3" REQUIRED, 3" PROVIDED
NOTE: NO CREDIT FOR ADDITIONAL CONTRIBUTING IMPERVIOUS DRAINAGE AREA IS TAKEN FOR UP-GRADE AREA THAT IS NOT INSTALLED AS PERMEABLE PAVEMENT.

Table 7.6. Material Specifications for Underneath the Pavement Surface		
Material	Specification	Notes
Bedding Layer	PC: None PA: 2 in. of No. 57 stone IP: 2 in. of No. 8 stone over 4 inches of No. 57 stone	ASTM D448 size No. 8 stone (e.g. 3/8 to 3/16 inch in size). Should be washed and clean and free of all fines.
Reservoir Layer	PC: No. 57 stone PA: No. 2 stone IP: No. 2, 3, or 4 stone	ASTM D448 size No. 57 stone (e.g. 1 1/2 to 1/2 inch in size). No. 2 Stone (e.g. 3 inch to 3/4 inch in size). Depth is based on the pavement structural and hydraulic requirements. Should be washed and clean and free of all fines.
Underdrain	Use 4 to 6 inch diameter perforated PVC (AASHTO M 252) pipe, with 3/8-inch perforations at 6 inches on center, each underdrain installed at a minimum 0.5% slope located 20 feet or less from the next pipe (or equivalent corrugated HDPE may be used for smaller load-bearing applications). Perforated pipe installed for the full length of the permeable pavement cell, and non-perforated pipe, as needed, is used to connect with the storm drain system. T's and Y's installed as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with vented caps at the T's and Y's.	
Filter Layer	The underlying native soils should be separated from the stone reservoir by a thin, 2 to 4 inch layer of choker stone (e.g. No. 8) covered by a 6 to 8 inch layer of coarse sand (e.g. ASTM C-33, gradation).	The sand should be placed between the stone reservoir and the choker stone, which should be placed on top of the underlying native soils.
Filter Fabric (optional)	Use an appropriate filter fabric for the particular application based on AASHTO M288-06 Filter Fabric should have a Flow Rate greater than 125 gpm/sq. ft. (ASTM D4491), and an Apparent Opening Size (AOS) equivalent to a US #70 or # 80 sieve (ASTM D4751). The geotextile AOS selection is based on the percent passing the No. 200 sieve in "A" Soil subgrade, using FHWA or AASHTO selection criteria.	
Impermeable Liner	Use a thirty mil (minimum) PVC Geomembrane liner covered by 8 to 12 oz./sq. yd.2 non-woven geotextile. NOTE: THIS IS USED ONLY FOR KARST REGIONS.	
Observation Well	Use a perforated 4 to 6 inch vertical PVC pipe (AASHTO M 252) with a lockable cap, installed flush with the surface.	

Table 7.7. Different Permeable Pavement Specifications		
Material	Specification	Notes
Permeable Interlocking Concrete Pavers	Surface open area: 5% to 15%. Thickness: 3.125 inches for vehicles. Compressive strength: 55 Mpa. Open void fill media: aggregate.	Must conform to ASTM C936 specifications. Reservoir layer required to support the structural load.
Concrete Grid Pavers	Open void content: 20% to 50%. Thickness: 3.5 inches. Compressive strength: 35 Mpa. Open void fill media: aggregate, topsoil and grass, coarse sand.	Must conform to ASTM C 1319 specifications. Reservoir layer required to support the structural load.
Plastic Reinforced Grid Pavers	Void content: depends on fill material. Compressive strength: varies, depending on fill material. Open void fill media: aggregate, topsoil and grass, coarse sand.	Reservoir layer required to support the structural load.
Pervious Concrete	Void content: 15% to 25%. Thickness: typically 4 to 8 inches. Compressive strength: 2.8 to 28 Mpa. Open void fill media: None.	May not require a reservoir layer to support the structural load, but a layer may be included to increase the storage or infiltration.
Porous Asphalt	Void content: 15% to 20%. Thickness: typically 3 to 7 in. (depending on traffic load). Open void fill media: None.	Reservoir layer required to support the structural load.

Table 7.8. Recommended Maintenance Tasks for Permeable Pavement Practices	
Maintenance Task	Frequency ¹
• For the first 6 months following construction, the practice and contributing drainage area should be inspected at least twice after storm events that exceed 1/2 inch of rainfall. Conduct any needed repairs or stabilization.	After installation
• Mow grass in grid paver applications	At least 1 time every 1-2 months during the growing season
• Stabilize the CDA to prevent erosion	As needed
• Remove any soil or sediment deposited on pavement.	As needed
• Replace or repair any necessary pavement surface areas that are deteriorating or spalling	2-4 times per year (depending on use)
• Vacuum pavement with a standard street sweeper to prevent clogging	Annually
• Conduct a maintenance inspection	Once every 2 to 3 years
• Spot weeding of grass applications	Once every 2 to 3 years
• Remove any accumulated sediment in pre-treatment cells and inflow points	Once every 2 to 3 years
• Conduct maintenance using a regenerative street sweeper	If clogged
• Replace any necessary joint material	If clogged

N040

TECHNICAL DATA SHEET

NONWOVEN GEOTEXTILE

* OR EQUIVALENT

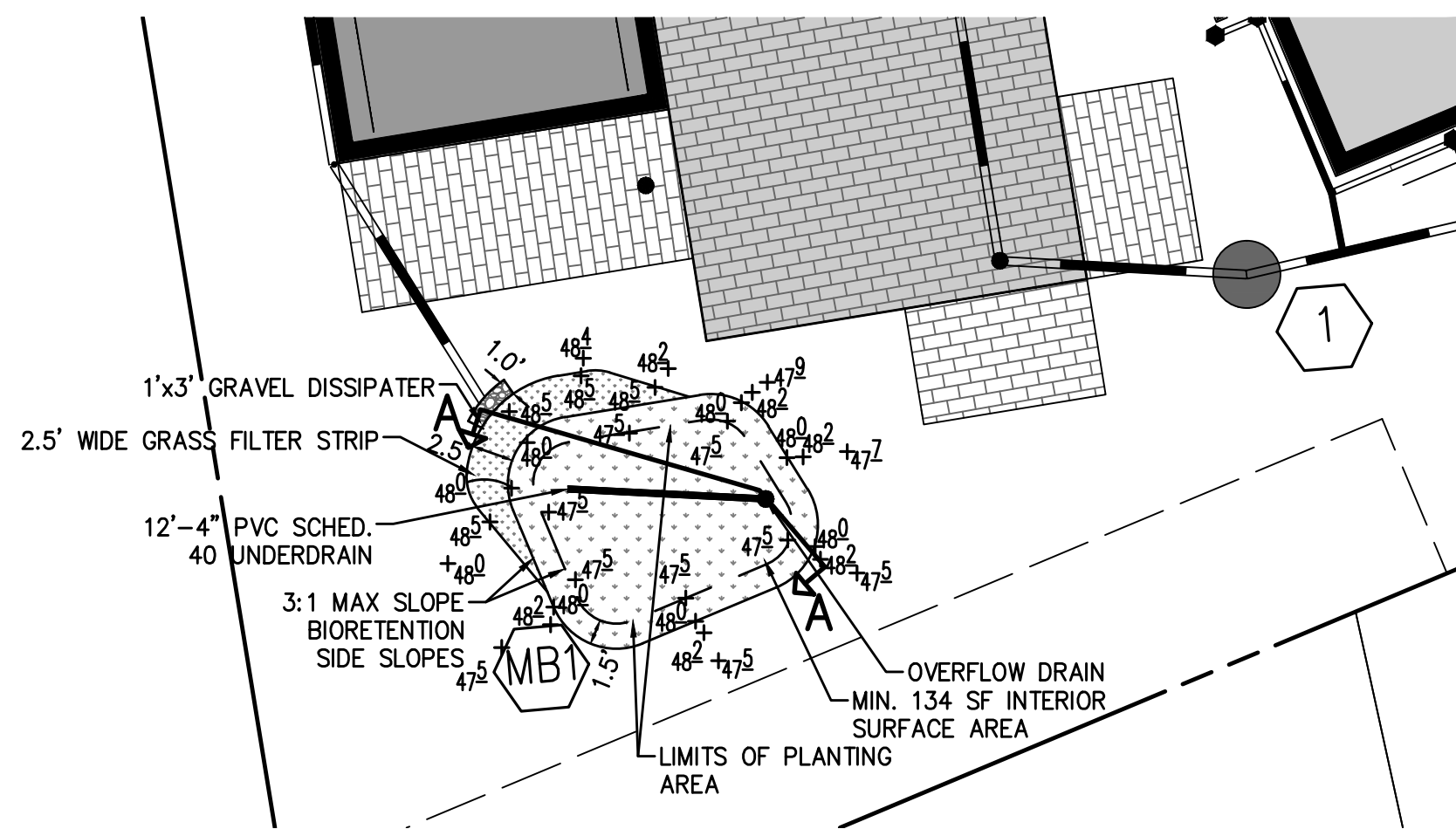
N040 is a polypropylene, needle punched nonwoven geotextile for use in drainage and separation applications. It has been stabilized to resist degradation due to ultraviolet exposure and is resistant to commonly encountered mildew, insects and soil chemicals, and is non-biodegradable.

SPECIFICATIONS:		
The N040 polypropylene nonwoven fabric will utilize the following characteristics:		
PROPERTY	TEST METHOD	TYPICAL ROLL VALUE
Grab Tensile Strength	ASTM D4632	100 lbs
Grab Tensile Elongation	ASTM D4632	50%
CBR Puncture	ASTM D6241	280 lbs
Trapezoid Tear Strength	ASTM D4533	50 lbs
UV Resistance @ 500 hrs	ASTMD4355	70%
Apparent Opening Size (AOS)	ASTM D4751	70 US Sieve
Permeability (sec ⁻¹)	ASTM D4491	2.0 (sec ⁻¹)
Flow Rate	ASTM D4491	140 gpm/ft ²

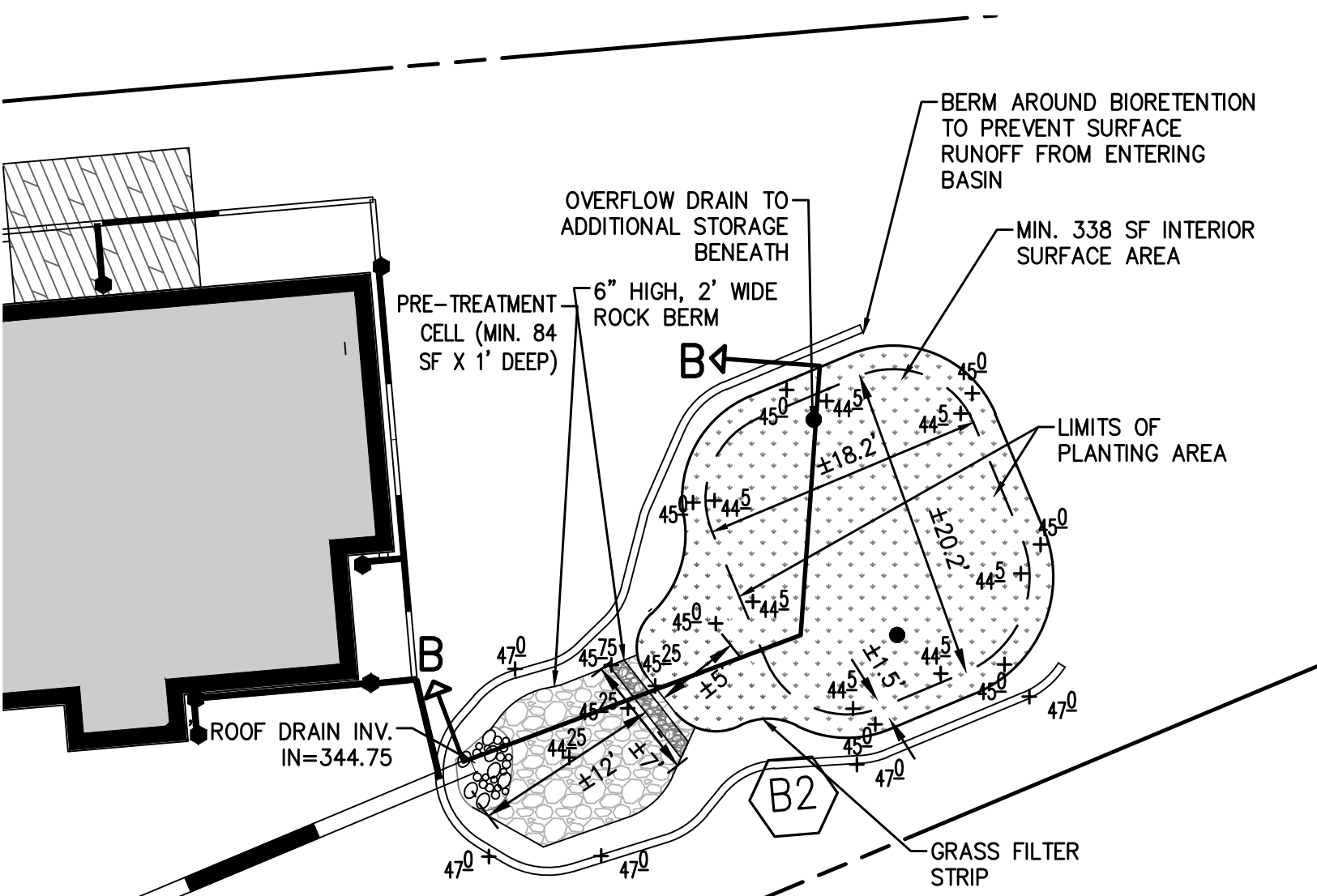
Values quoted above are the result of multiple tests conducted at an independent testing facility. N040 meets or exceeds values listed.
¹ Values apply to both machine and cross-machine directions

For more information about our products, contact Mike Sales at 800.448.3036 or email at info@acffab.com

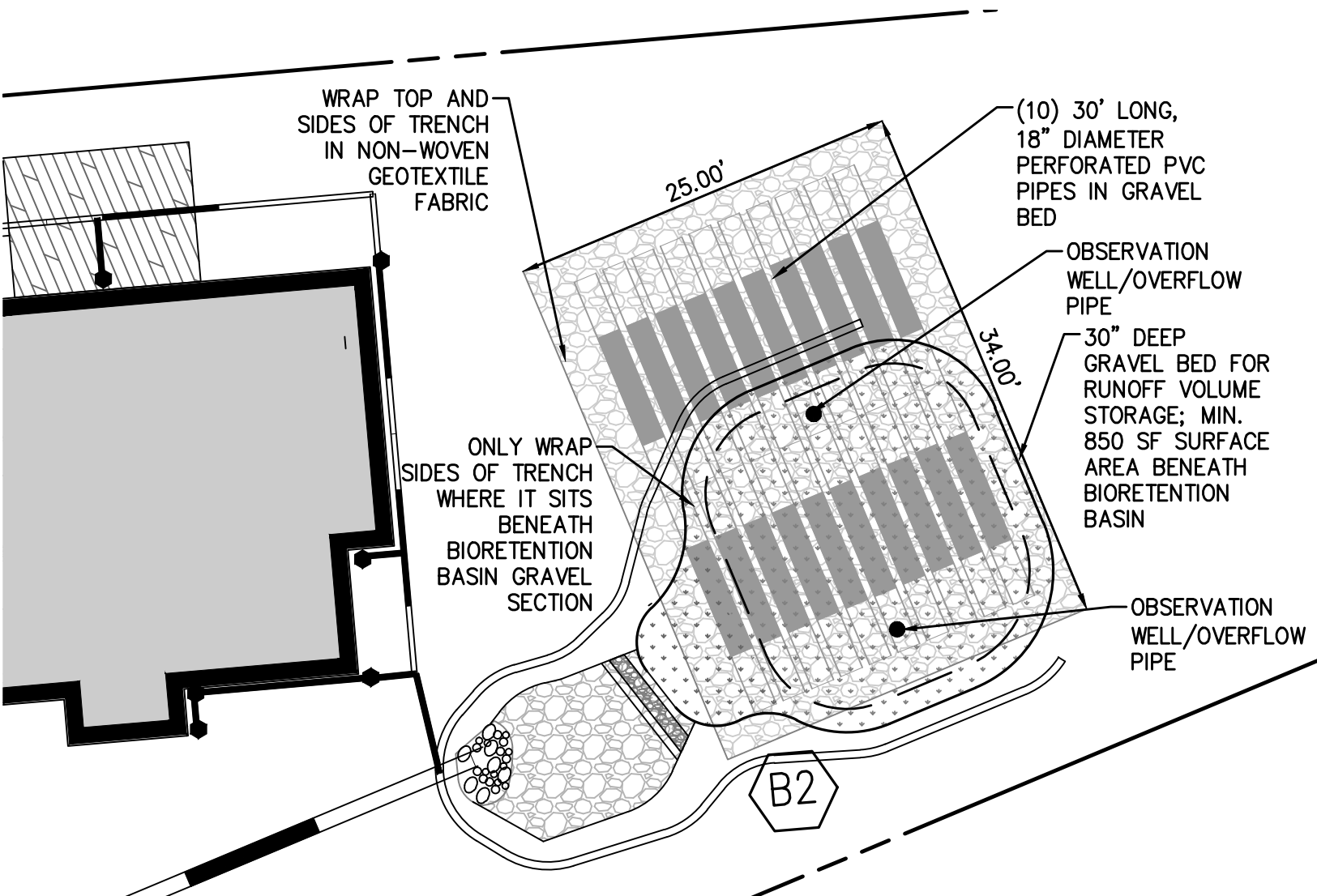
ACF
ADVANCED CONSTRUCTION FABRICS



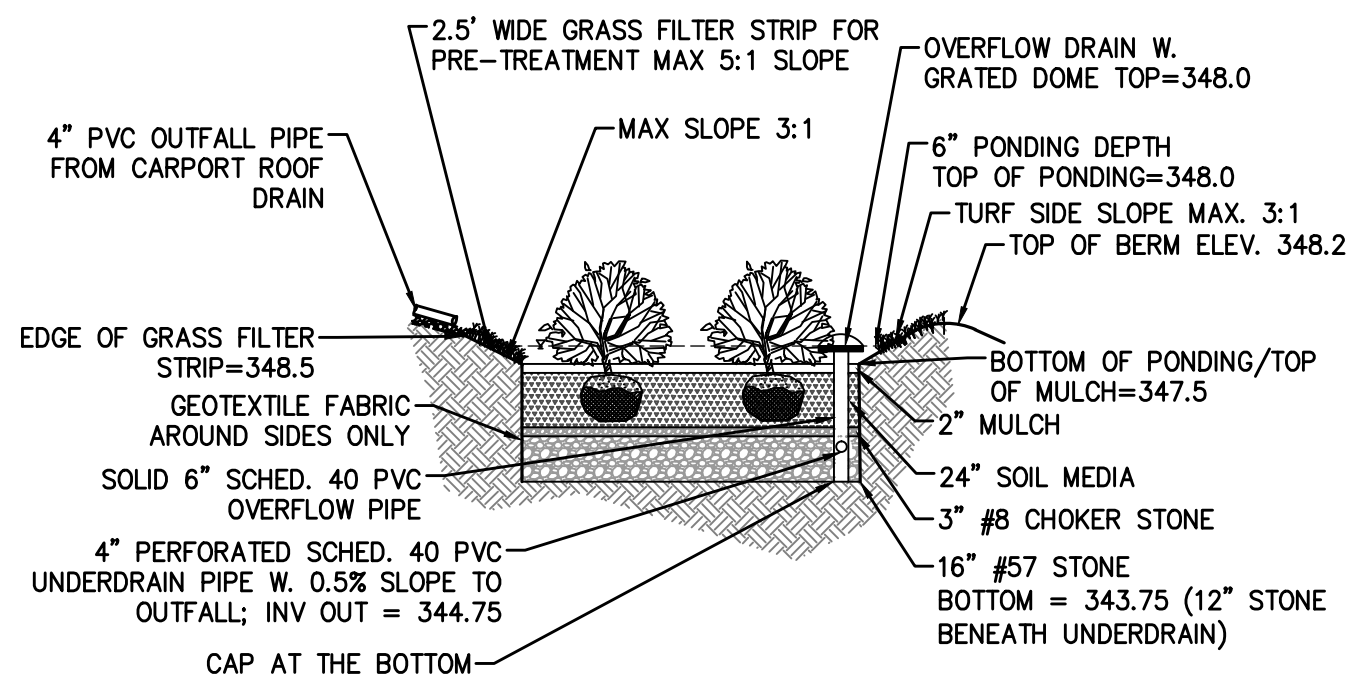
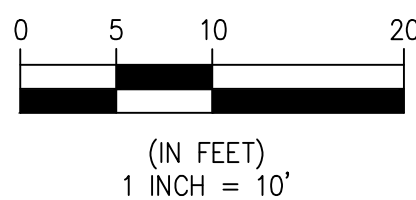
MICRO-BIORETENTION #1 LEVEL II ENLARGEMENT
SCALE: 1"=10'



BIORETENTION #2 LEVEL II ENLARGEMENT
SCALE: 1"=10'



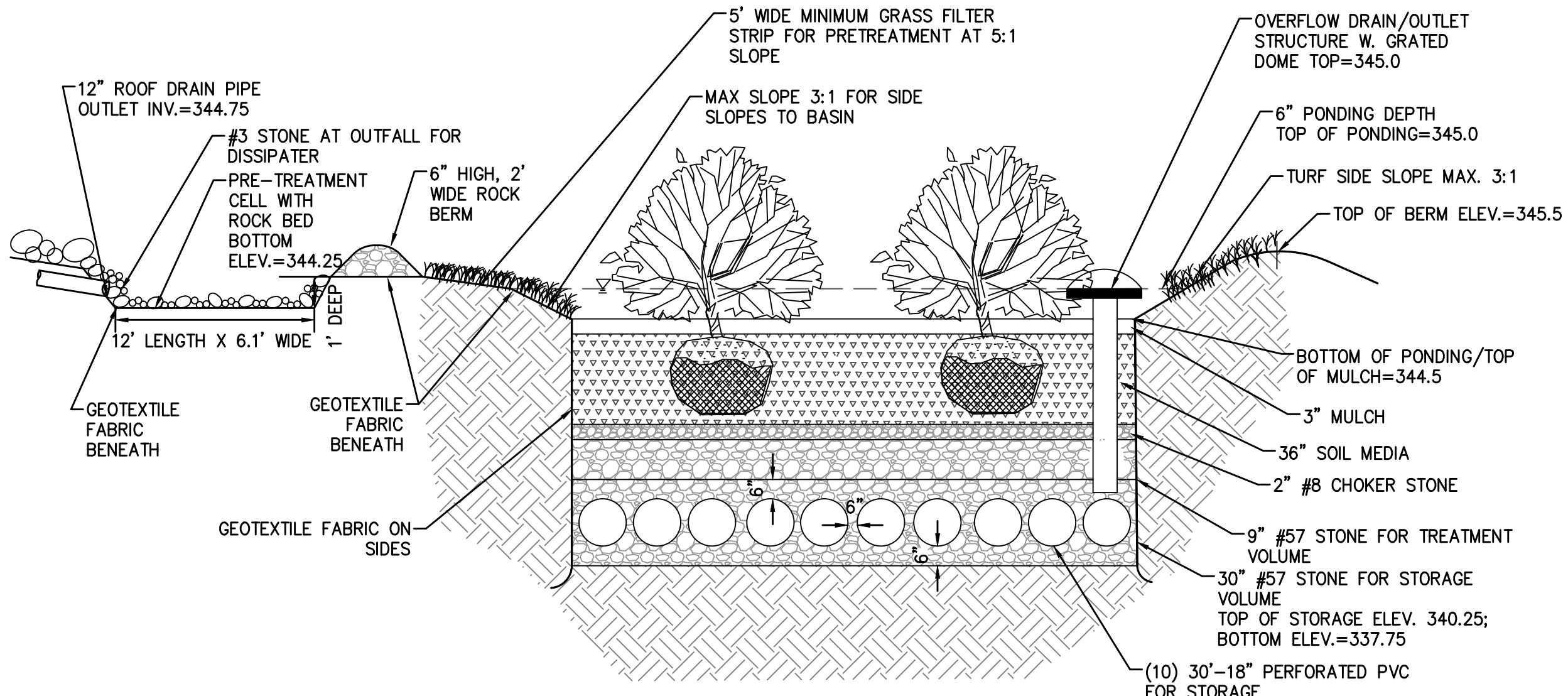
UNDERGROUND STORAGE BENEATH BIORETENTION ENLARGEMENT
SCALE: 1"=10'



MICRO-BIORETENTION #1 DETAIL SECTION A-A
NTS

MICRO-BIORETENTION #1 LEVEL II
AREA TO BIORETENTION
TREAT 1.25" STORM RUNOFF PER DEQ SPEC. #9
TBMP = 0.95 x 1860 SF x 0.104' = 185 CF
SIZE OF THE BIORETENTION = 134 SF
V1 (PONDING DEPTH) = 134 SF X 0.5 = 67 CF
V2 (SOIL MEDIA) = 134 SF X 2 X 0.25 (VOIDS) = 67 CF
V3 (#57 & PEA GRAVEL) = 134 SF X 1 X 0.4 (VOIDS) = 53 CF
TOTAL VOLUME = 187 CF PROVIDED

1860 SF



BIORETENTION #2 DETAIL SECTION B-B
NTS

DRAINAGE AREA 'B' GRAVEL INFILTRATION VOLUME CALCULATION

AREA TO BIORETENTION FROM ROOFS	5609 SF
10-YEAR RV FROM VRRM	2.61 IN
TOTAL 10-YR RUNOFF VOLUME	1159 CF
DRAWDOWN TIME CALCULATION:	
INFILTRATION RATE	0.7 IN/HR
DESIGN RATE	0.35 IN/HR
INFILTRATION SURFACE AREA	850 SF
DRAWDOWN TIME	1.95 DAYS
	1.95 DAYS < 2.0 DAYS MAX
STORAGE VOLUME PROVIDED:	
SURFACE AREA	850 SF
DEPTH OF GRAVEL	2.50 FT
GRAVEL VOID RATIO	0.4
GRAVEL STORAGE VOLUME VOLUME	637 CF
18" PERFORATED PVC AREA	1.77
LENGTH OF PIPE	30'
# OF PIPES	10
PIPE STORAGE VOLUME	530 CF
TOTAL STORAGE VOLUME PROVIDED	1167 CF
	1167 CF > 1159 CF

BIORETENTION #2 LEVEL II
AREA TO BIORETENTION
TREAT 1.25" STORM RUNOFF PER DEQ SPEC. #9
TBMP = 0.95 x 5609 SF x 0.104' = 556 CF
SIZE OF THE BIORETENTION = 338 SF
V1 (PONDING DEPTH) = 338 SF X 0.5 = 169 CF
V2 (SOIL MEDIA) = 338 SF X 3 X 0.25 (VOIDS) = 253 CF
V3 (#57 & PEA GRAVEL) = 338 SF X 1 X 0.4 (VOIDS) = 135 CF
TOTAL VOLUME = 557 CF PROVIDED
PRE-TREATMENT CELL MIN. VOLUME (15% OF TV) = 84 CF

5609 SF

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9

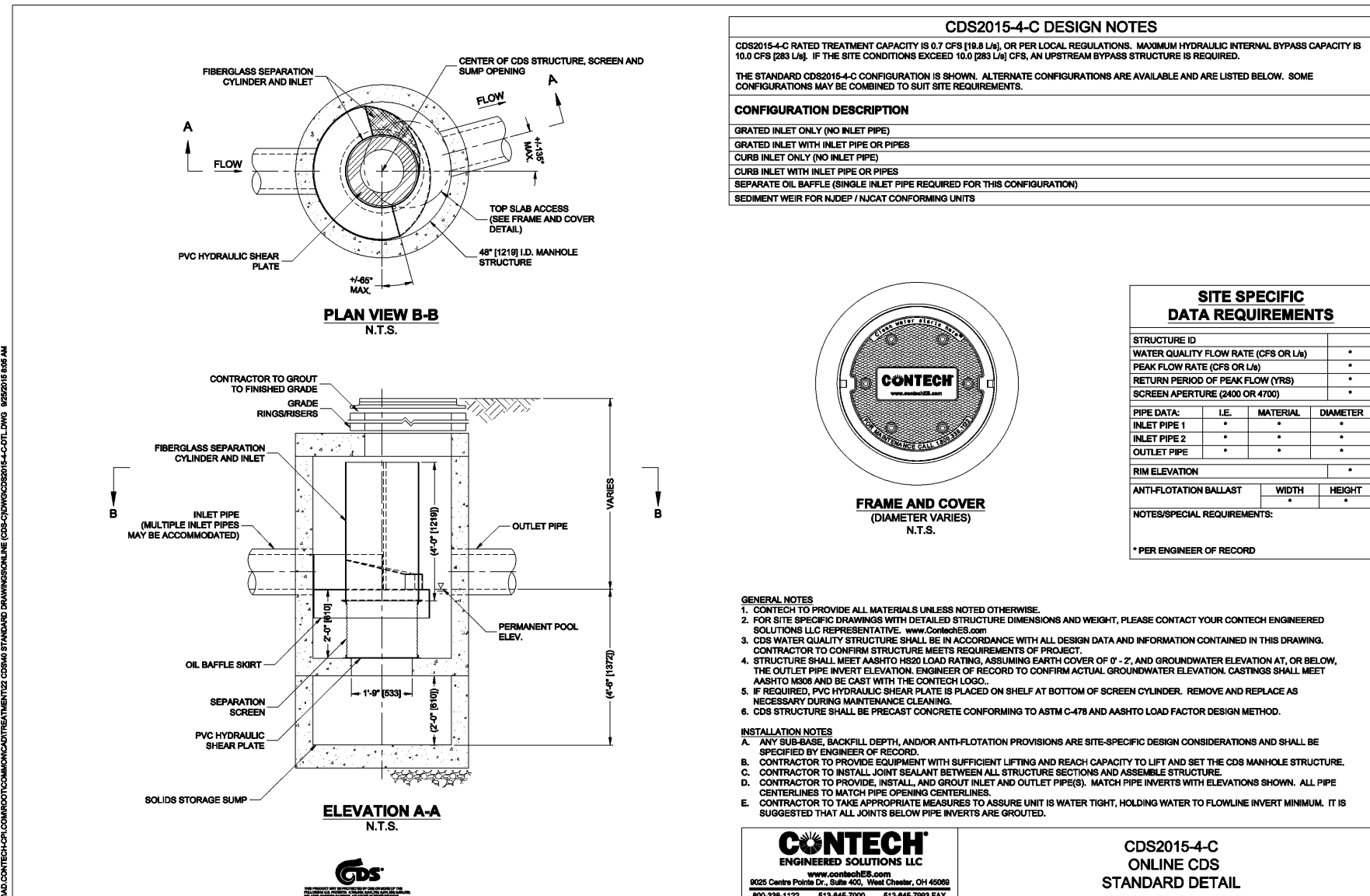
BIORETENTION

Material	Specification	Notes
Filter Media Composition	Filter Media to contain: • 80% - 90% sand • 10%-20% soil fines • 3%-5% organic matter	The volume of filter media based on 110% of the plan volume, to account for settling or compaction.
Filter Media Testing	Available P between L+ and M per DCR 2005 Nutrient Management Criteria.	The media should be certified by the supplier.
Mulch Layer	Use aged, shredded hardwood bark mulch or stable coarse compost.	Lay a 2 to 3 inch layer on the surface of the filter bed.
Alternative Surface Cover	Use river stone or pea gravel, coir and jute matting, or turf cover.	Lay a 2 to 3 inch layer of to suppress weed growth.
Top Soil For Turf Cover	Loamy sand or sandy loam texture, with less than 5% clay content, pH corrected to between 6 and 7, and an organic matter content of at least 2%.	3 inch surface depth.
Geotextile/Liner	Use a non-woven geotextile fabric with a flow rate of > 110 gal./min./sq. ft. (e.g., Geotex 351 or equivalent)	Apply only to the sides and directly above the underdrain. For hotspots and certain karst sites only, use an appropriate liner on bottom.
Choking Layer	Lay a 2 to 4 inch layer of sand over a 2 inch layer of choker stone (typically #8 or #89 washed gravel), which is laid over the underdrain stone.	
Stone Jacket for Underdrain and/or Storage Layer	1 inch stone should be double-washed and clean and free of all fines (e.g., VDOT #57 stone).	12 inches for the underdrain; 12 to 18 inches for the stone storage layer, if needed
Underdrains, Cleanouts, and Observation Wells	Use 6 inch rigid schedule 40 PVC pipe (or equivalent corrugated HDPE for micro-bioretentment), with 3/8-inch perforations at 6 inches on center; position each underdrain on a 1% or 2% slope located not more than 20 feet from the next pipe.	Establish plant materials as specified in the landscaping plan and the recommended plant list. In general, plant spacing must be sufficient to ensure the plant material achieves 80% cover in the proposed planting areas within a 3-year period. If seed mixes are used, they should be from a qualified supplier, should be appropriate for stormwater basin applications, and should consist of native species (unless the seeding is to establish maintained turf).
Plant Materials	Plant one tree per 250 square feet (15 feet on-center, minimum 1 inch caliper). Shrubs a minimum of 30 inches high planted a minimum of 10 feet on-center. Plant ground cover plugs at 12 to 18 inches on-center; Plant container-grown plants at 18 to 24 inches on-center, depending on the initial plant size and how large it will grow.	

VA DCR STORMWATER DESIGN SPECIFICATION NO. 9

BIORETENTION

Maintenance Tasks	Frequency
• Mowing of grass filter strips and bioretention turf cover	At least 4 times a year
• Spot weeding, erosion repair, trash removal, and mulch raking	Twice during growing season
• Add reinforcement planting to maintain desired the vegetation density	As needed
• Remove invasive plants using recommended control methods	
• Stabilize the contributing drainage area to prevent erosion	
• Spring inspection and cleanup	Annually
• Supplement mulch to maintain a 3 inch layer	
• Prune trees and shrubs	
• Remove sediment in pre-treatment cells and inflow points	Once every 2 to 3 years
• Replace the mulch layer	Every 3 years



Project Name:	Railroad Cottages	Date:	8/21/17
Site Designation:	1	County or Independent City:	Falls Church, VA
State:	VA	Design Engineer:	JLW
Annual Rainfall (inches)	4.1	Target Rainfall Event, P (inches)	1.00
Volume from Upstream Runoff Reduction Practice to BMP:		Remaining Volume from Upstream RR Practice (cf)	0
Managed Turf		Runoff Coefficient (K _r)	0.00
Impervious Cover		Runoff Coefficient (K _r)	0.95
Volume from Additional Credit Area to BMP:		Treatment Volume from Untreated Credit Area (cf)	0
Managed Turf		Runoff Coefficient (K _r)	0.00
Impervious Cover		Runoff Coefficient (K _r)	0.95
Total Volume to be Treated	276	Composite R _v	0.95
Total Effective Area to be Treated	0.28	Unit Peak Discharge (cu)	1000
Time of Concentration (T _c)	5.00	Unit Peak Discharge (cu)	1000
Treatment Volume Peak Discharge	0.12	Model Name	2015-4

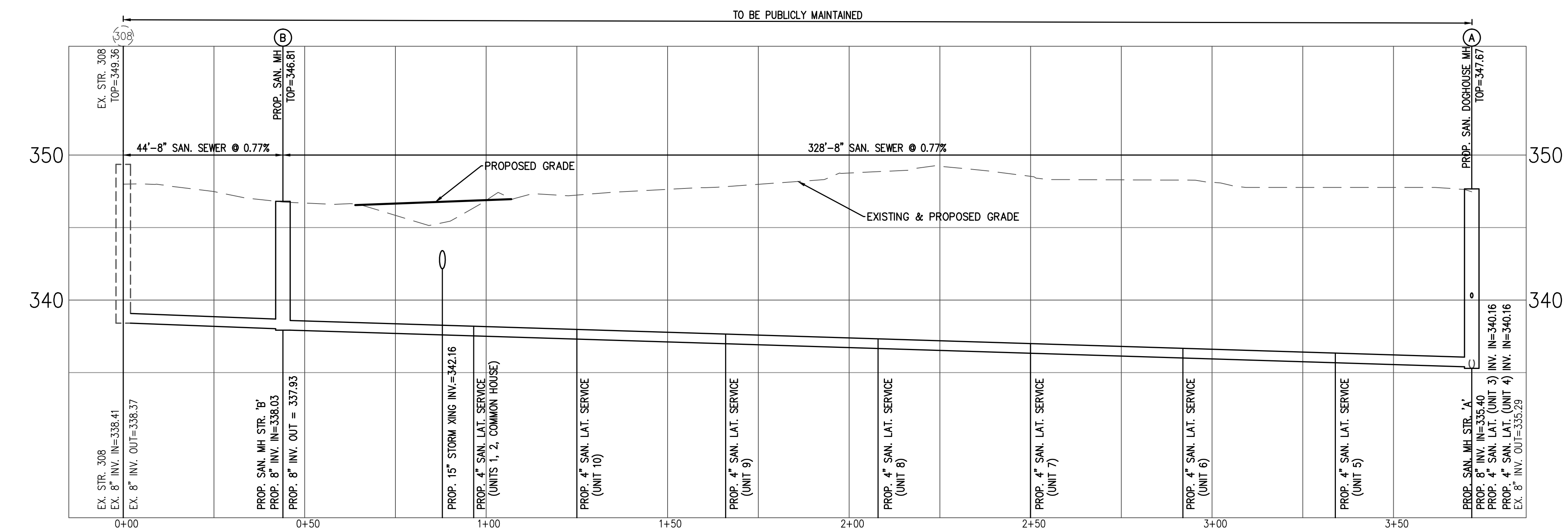
Project Name:	Railroad Cottages	Date:	8/21/17
Site Designation:	2	County or Independent City:	Falls Church, VA
State:	VA	Design Engineer:	JLW
Annual Rainfall (inches)	4.1	Target Rainfall Event, P (inches)	1.00
Volume from Upstream Runoff Reduction Practice to BMP:		Remaining Volume from Upstream RR Practice (cf)	0
Managed Turf		Runoff Coefficient (K _r)	0.00
Impervious Cover		Runoff Coefficient (K _r)	0.95
Volume from Additional Credit Area to BMP:		Treatment Volume from Untreated Credit Area (cf)	0
Managed Turf		Runoff Coefficient (K _r)	0.00
Impervious Cover		Runoff Coefficient (K _r)	0.95
Total Volume to be Treated	262	Composite R _v	0.95
Total Effective Area to be Treated	0.08	Unit Peak Discharge (cu)	1000
Time of Concentration (T _c)	5.00	Unit Peak Discharge (cu)	1000
Treatment Volume Peak Discharge	0.11	Model Name	2015-4

NO.	DESCRIPTION	DATE	APPROVED BY	REVISION	DATE

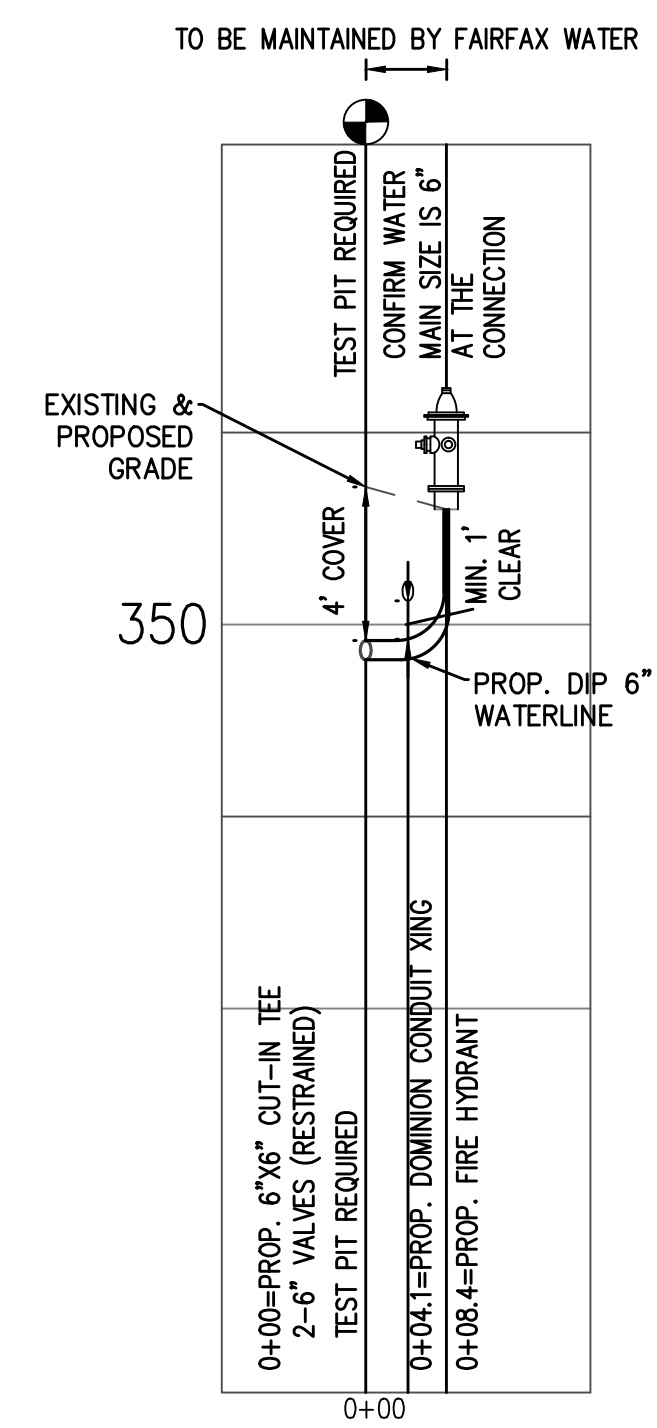


PROPOSED SANITARY LATERAL SCHEDULE									
RAILROAD AVE.	FROM MH B	TO MH A	SANITARY STATION	8" MAIN INVERT	4" INVERT @ MAIN	LENTH TO C.O.	4" INV. @ C.O.	SLOPE TO C.O.	
			CO 1A	0+53	337.52	338.19	70.88	339.67	2.08%
			CO 1				29.18	342.58	10.00%
			CO 2A				60.25	342.68	5.00%
			CO 2				7.32	343.04	5.00%
			CO 2B				67.92	346.07	5.00%
			CO 10	0+81	337.31	337.98	13.85	339.36	10.00%
			CO 9	1+22	336.99	337.66	13.50	339.04	10.00%
			CO 8	1+64	336.66	337.33	13.50	338.68	10.00%
			CO 7	2+06	336.34	337.01	13.50	338.36	10.00%
			CO 6	2+48	336.02	336.69	13.50	338.04	10.00%
			CO 5	2+90	335.70	336.37	13.50	337.72	10.00%
			CO 4	3+28	335.40	340.16	14.18	341.58	10.00%
			CO 3	3+28	335.40	340.16	64.36	341.50	2.08%

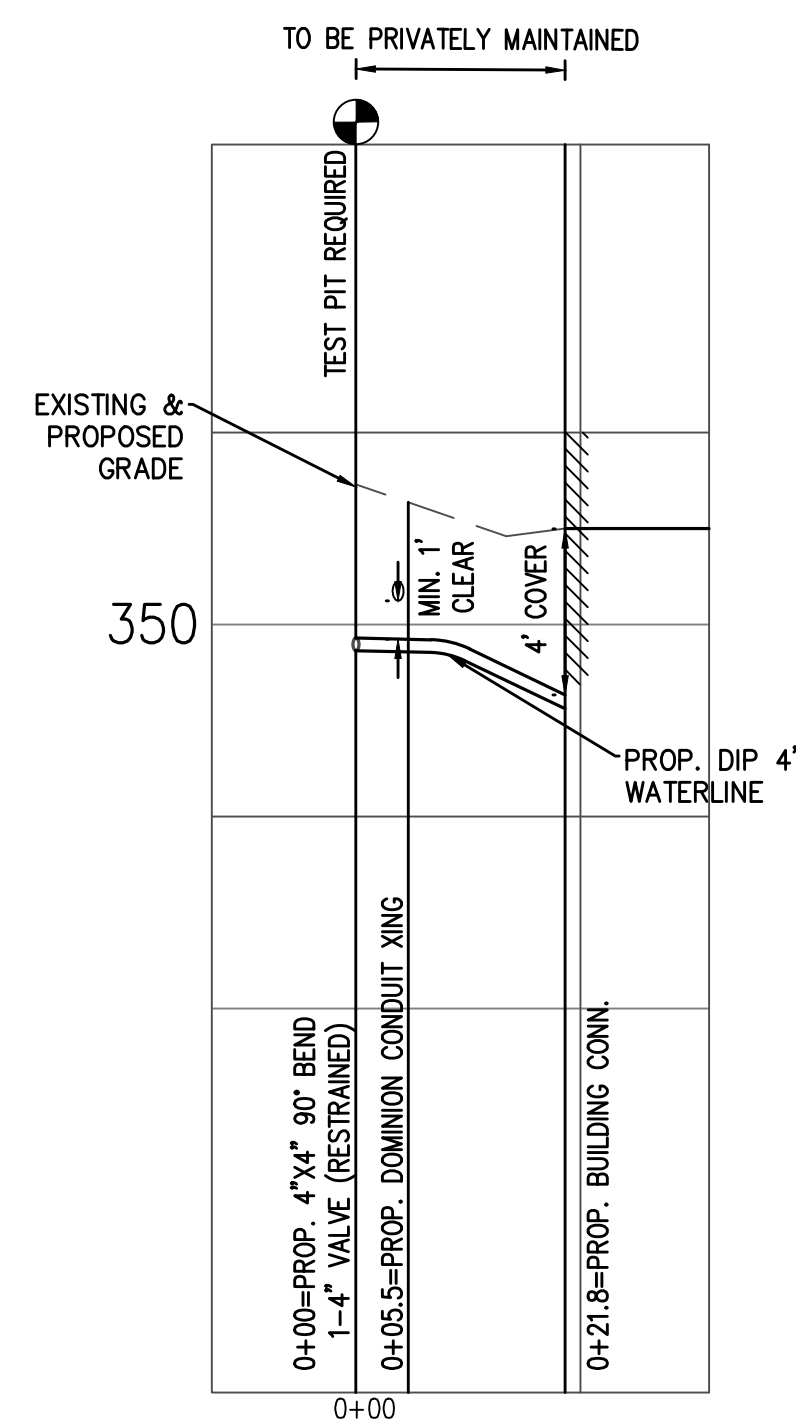
NOTE: PUBLIC WORKS INSPECTOR MUST BE PRESENT WHEN NEW PUBLIC SANITARY SEWER IS INSTALLED. CONTRACTOR TO COORDINATE WITH PUBLIC WORKS.



SANITARY PROFILE
SCALE: H: 1"=20'
V: 1"=5'



FIRE HYDRANT PROFILE
SCALE: H: 1"=20'
V: 1"=5'



DOMESTIC SERVICE PROFILE
SCALE: H: 1"=20'
V: 1"=5'

UTILITY PROFILES

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA

WALTER L. PHILLIPS
INCORPORATED
ENGINEERS • SURVEYORS • PLANNERS
LANDSCAPE ARCHITECTS • ARBORISTS
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com
ESTABLISHED 1945
DATE: 9/12/2017, 10/20/2017, 11/8/2017, 12/12/2017
CHECKED: KW
DRAWN: AI
VERT. 1"=5'
SCALE: HOR. 1"=20'

Tree Inventory - Railroad Ave - Falls Church, VA												
									Activities			
Tree #	Botanical Name	Common Name	Size DBH (in)	Critical Root Zone (CRZ) Radius (ft)	Species Rating (%)	Condition %	Removal	Tree Protection Fence/ Super 8ft Fence	Root Frame			
Tree Survey Information Completed by Water Phillips, Inc - Arborist Ben Schitter- ISA # MA-5385A # (project) 1/9/2017												
1	Morus alba	White mulberry	14"	21'	30%	50%	X			lean		
2	Juglans nigra	Black walnut	25"	38'	68%	75%		X	X			
3	Fraxinus americana	White ash	5"	8'	53%	69%	X					
4	Fraxinus americana	White ash	40"	60'	53%	59%	X			multi-stem		
6	Quercus alba	White oak	7"	11'	88%	50%	X			vines		
7	Dead	Dead	8"	0'	0%	0%	X					
8	Dead	Dead	6"	0'	0%	0%	X					
9	Quercus alba	White oak	9"	14'	88%	50%	X			vines		
10	Fraxinus americana	White ash	2"	8'	53%	66%	X					
11	Juglans nigra	Black walnut	24"	36'	68%	63%	X			lean, vines		
12	Acer platanoides	Norway maple	3"	8'	55%	63%	X					
13	Juglans nigra	Black walnut	20"	30'	68%	66%	X			vines		
14	Fraxinus americana	White ash	18"	27'	53%	66%	X					
15	Fraxinus americana	White ash	18"	27'	53%	69%	X					
16	Morus alba	White mulberry	16"	24'	30%	47%	X			lean		
18	Morus alba	White mulberry	6"	9'	30%	50%	X			vines		
19	Morus alba	White mulberry	8"	12'	30%	50%	X			vines		
20	Comus florida	Flowering dogwood	4"	8'	60%	50%	X			vines		
21	Acer platanoides	Norway maple	3"	8'	55%	50%	X			vines		
22	Morus alba	White mulberry	12"	18'	30%	50%	X			vines		
23	Acer rubrum	Red maple	28"	42'	70%	47%	X			major damage		
24	Acer rubrum	Red maple	12"	18'	70%	63%		X	X	shared		
25	Morus alba	White mulberry	6"	9'	30%	50%	X					
27	Robinia pseudoacacia	Black locust	13"	20'	55%	56%	X			vines		
28	Robinia pseudoacacia	Black locust	4"	8'	55%	50%	X			vines		
29	Prunus serotina	Black cherry	5"	8'	55%	59%	X			vines		
30	Prunus serotina	Black cherry	4"	8'	55%	59%	X					
31	Robinia pseudoacacia	Black locust	6"	9'	55%	50%	X			vines		
32	Robinia pseudoacacia	Black locust	24"	36'	55%	50%	X			vines		
33	Acer rubrum	Red maple	15"	23'	70%	50%	X			vines, lean		
34	Morus alba	White mulberry	6"	9'	30%	50%		X	X	grown into fence, offsite		
37	Morus alba	White mulberry	30"	45'	30%	50%	X			multi-stem		
38	Juglans nigra	Black walnut	14"	21'	68%	69%	X					
39	Juglans nigra	Black walnut	6"	9'	68%	69%	X					
40	Juglans nigra	Black walnut	6"	9'	68%	69%	X					
41	Juglans nigra	Black walnut	20"	30'	68%	69%	X					
42	Fraxinus americana	White ash	18"	27'	53%	66%	X					
43	Morus alba	White mulberry	16"	24'	30%	56%	X					
44	Morus alba	White mulberry	9"	14'	30%	59%	X					
45	Ulmus rubra	Slippery elm	25"	38'	73%	59%	X			multi-stem		
46	Morus alba	White mulberry	20"	30'	30%	59%	X			multi-stem		
47	Acer platanoides	Norway maple	26"	39'	55%	56%	X			lean		
48	Robinia pseudoacacia	Black locust	14"	21'	55%	50%	X			vines		
49	Robinia pseudoacacia	Black locust	4"	8'	55%	50%	X			vines		
50	Morus alba	White mulberry	5"	8'	30%	69%		X	X			
51	Morus alba	White mulberry	12"	18'	30%	63%	X					
52	Fraxinus americana	White ash	15"	23'	53%	50%	X			vines, lean		
53	Morus alba	White mulberry	3"	8'	30%	69%	X					
54	Juglans nigra	Black walnut	40"	60'	68%	59%	X					
55	Quercus alba	White oak	12"	18'	88%	72%	X					
56	Morus alba	White mulberry	8"	12'	30%	63%	X			vines		
57	Prunus serotina	Black cherry	9"	14'	55%	69%	X					
58	Juglans nigra	Black walnut	10"	15'	68%	69%	X					
59	Tilia americana	American basswood	20"	30'	73%	56%	X			co-dominant, lean		
60	Robinia pseudoacacia	Black locust	8"	12'	55%	66%	X					
61	Acer rubrum	Red maple	60"	90'	70%	23%	X					
62	Robinia pseudoacacia	Black locust	30"	45'	55%	50%	X					
63	Juglans nigra	Black walnut	11"	17'	68%	66%	X					
64	Morus alba	White mulberry	13"	20'	30%	50%	X			co-dominant, deadwood		
65	Juglans nigra	Black walnut	20"	30'	68%	59%	X			vines		
66	Morus alba	White mulberry	8"	12'	30%	59%	X					
67	Morus alba	White mulberry	10"	15'	30%	59%	X					
68	Juglans nigra	Black walnut	4"	8'	68%	63%	X					
69	Fraxinus americana	White ash	12"	18'	53%	72%	X					
70	Robinia pseudoacacia	Black locust	20"	30'	55%	63%	X			multi-stem		
DBH = Diameter at Breast Height (measured 4.5 feet above ground)												
CRZ = Critical Root Zone = 1.5 foot radius per inch of tree diameter												
CRZ values for trees with multiple stems were calculated using the diameter of a tree with the basal area equivalent to the sum of the basal areas for all stems.												
Condition Ratings provided as percentages based on methods outlined in the 9th edition of the Guide for Plant Appraisal, published												

Tree Inventory - Railroad Ave - Falls Church, VA												
											Activities	
Tree #	Botanical Name	Common Name	Size DBH (in)	Critical Root Zone (CRZ) Radius (ft)	Species Rating (%)	Condition %	Removal	Tree Protection Fence/ Super 8ft Fence	Root Frame			Notes
Tree Survey Information Completed by Water Phillips, Inc - Arborist Ben Schitter- ISA # MA-5385A # (project) 1/9/2017												
74	Morus alba	White mulberry	13"	20'	30%	63%	X					
75	Morus alba	White mulberry	9"	14'	30%	63%	X					
76	Morus alba	White mulberry	10"	15'	30%	63%	X					
77	Quercus palustris	Pin oak	13"	20'	70%	59%	X					heavy pruned
78	Acer rubrum	Red maple	24"	36'	70%	66%	X					vines
79	Morus alba	White mulberry	10"	15'	30%	66%	X					twin
80	Robinia pseudoacacia	Black locust	12"	18'	55%	59%	X					
81	Robinia pseudoacacia	Black locust	6"	9'	55%	59%	X					
82	Liriodendron tulipifera	Yellow-poplar	8"	12'	70%	69%	X					
83	Prunus serotina	Black cherry	20"	30'	55%	66%	X					multi-stem
84	Morus alba	White mulberry	8"	12'	30%	63%	X					
85	Morus alba	White mulberry	4"	8'	30%	63%	X					
86	Dead	Dead	5"	0'	0%	0%	X					
87	Morus alba	White mulberry	4"	8'	30%	69%	X					
88	Morus alba	White mulberry	11"	17'	30%	63%	X					
89	Morus alba	White mulberry	11"	17'	30%	63%	X					
90	Quercus palustris	Pin oak	38"	57'	70%	75%	X					dead wood
91	Juglans nigra	Black walnut	13"	20'	68%	72%	X					
92	Juglans nigra	Black walnut	9"	14'	68%	75%	X					
93	Quercus palustris	Pin oak	27"	41'	70%	63%	X					co-dominant, vines
94	Juglans nigra	Black walnut	15"	23'	68%	69%	X					
95	Acer platanoides	Norway maple	15"	23'	55%	69%	X					co-dominant
96	Prunus serotina	Black cherry	9"	14'	55%	66%	X					lean
97	Robinia pseudoacacia	Black locust	30"	45'	55%	69%	X					
98	Acer platanoides	Norway maple	8"	12'	55%	47%	X					
99	Comus florida	Flowering dogwood	5"	8'	60%	63%	X					
100	Robinia pseudoacacia	Black locust	18"	27'	55%	59%	X					vines, dead wood
129	Robinia pseudoacacia	Black locust	3"	8'	55%	53%	X					
130	Robinia pseudoacacia	Black locust	15"	23'	55%	53%	X					dead wood
131	Robinia pseudoacacia	Black locust	16"	24'	55%	53%	X					dead wood, vines
132	Robinia pseudoacacia	Black locust	15"	23'	55%	69%	X					
133	Juglans nigra	Black walnut	18"	27'	68%	75%	X					
134	Ulmus rubra	Slippery elm	10"	15'	73%	66%	X					
135	Robinia pseudoacacia	Black locust	28"	42'	55%	53%	X					dead wood, vines
136	Prunus serotina	Black cherry	9"	14'	55%	72%	X					
137	Acer rubrum	Red maple	6"	9'	70%	50%	X					
138	Ulmus rubra	Slippery elm	12"	18'	73%	63%	X					
139	Robinia pseudoacacia	Black locust	6"	9'	55%	59%	X					
140	Robinia pseudoacacia	Black locust	3"	8'	55%	50%	X					
141	Robinia pseudoacacia	Black locust	10"	15'	55%	50%	X					
142	Robinia pseudoacacia	Black locust	4"	8'	55%	50%	X					
143	Dead	Dead	30"	0'	0%	0%	X					
144	Prunus spp.	Ornamental Cherry	16"	24'	55%	69%	X					
145	Ulmus rubra	Slippery elm	24"	36'	73%	66%	X					
146	Ilex opaca	American holly	4"	8'	73%	69%	X					
147	Cercis canadensis	Eastern redbud	8"	12'	73%	66%	X					
482	Cupressocyparis leylandii	Leyland cypress	10"	15'	60%	63%		X				
483	Cupressocyparis leylandii	Leyland cypress	10"	15'	60%	63%		X				
484	Cupressocyparis leylandii	Leyland cypress	8"	12'	60%	59%		X				
485	Fraxinus americana	White ash	10"	15'	53%	66%	X					dead wood
486	Ulmus rubra	Slippery elm	18"	27'	73%	63%	X					vines
487	Acer platanoides	Norway maple	7"	11'	55%	59%	X					vines, dead wood
488	Acer platanoides	Norway maple	4"	8'	55%	56%	X					lean
489	Acer platanoides	Norway maple	2"	8'	55%	63%	X					multi-stem
490	Liriodendron tulipifera	Yellow-poplar	20"	30'	70%	56%	X					vines, lean
491	Morus alba	White mulberry	13"	20'	30%	50%	X					lean
492	Acer platanoides	Norway maple	13"	20'	55%	50%	X					lean
493	Quercus alba	White oak	8"	12'	88%	63%	X					vines
494	Morus alba	White mulberry	5"	8'	30%	63%	X					lean, vines
496	Liriodendron tulipifera	Yellow-poplar	24"	36'	70%	56%		X	X			vines (cut), shared
498	Fraxinus americana	White ash	24"	36'	53%	63%	X					heavy lean
499	Fraxinus americana	White ash	4"	8'	53%	63%	X					dead wood
600	Pinus virginiana	Virginia pine	10"	15'	50%	72%	X					offsite
601	Ulmus rubra	Slippery elm	18"	27'	73%	69%	X					offsite
602	Juniperus virginiana	Eastern redcedar	12"	18'	75%	63%		X	X			offsite
603	Juniperus virginiana	Eastern redcedar	12"	18'	75%	63%		X	X			offsite
604	Juniperus virginiana	Eastern redcedar	12"	18'	75%	63%		X	X			offsite
605	Juniperus virginiana	Eastern redcedar	12"	18'	75%	63%		X	X			offsite
606	Juniperus virginiana	Eastern redcedar	12"	18'	75%	63%		X	X			offsite
DBH - Diameter at Breast Height (measured 4.5 feet above ground)												
CRZ - Critical Root Zone - 1.5 foot radius per inch of tree diameter												
CRZ values for trees with multiple stems were calculated using the diameter of a tree with the basal area equivalent to the sum of the basal areas, for all stems.												
Condition Ratings provided as percentages based on methods outlined in the 9th edition of the Guide for Plant Appraisal, published												

1. Prior to allowing any vehicle or construction equipment to enter the site, the construction foreman and project arborist (also foreman of company doing actual tree work if different from project arborist) is to meet the City Arborist to mark the location of the *limits of clearing*, *tree preservation fencing*, *erosion control fabric*, and *root pruning line* (where required), access routes, storage areas, and parking areas. The location of the LIMITS OF CLEARING TREE PRESERVATION FENCING is to be installed in accordance with the approved plan and field located from existing benchmarks, landmarks, and building stakeout survey markers. All work procedures and tree preservation measures are to be discussed at this time. An appointment must be made with the arborist for the City a minimum of three days prior to the establishment of the tree preservation measures is required by City Code (Sec. 35-15 (b), see enclosed. Contact the City Arborist for an appointment at 703-248-5183.

- a. Six (6) foot high chain link fence sections attached to one and five eights (1 5/8) inch outside diameter pipe with eleven (11) gauge mesh in a two (2) inch diamond pattern. The fencing noted above may be temporary panels set in concrete blocks at the base and secured at the top with saddle clamps
- or
- b. Four (4) foot high fourteen (14) gauge welded wire fence supported by six (6) foot long metal stakes (2" width) to be spaced eight (8) feet on center and sunk into the ground.

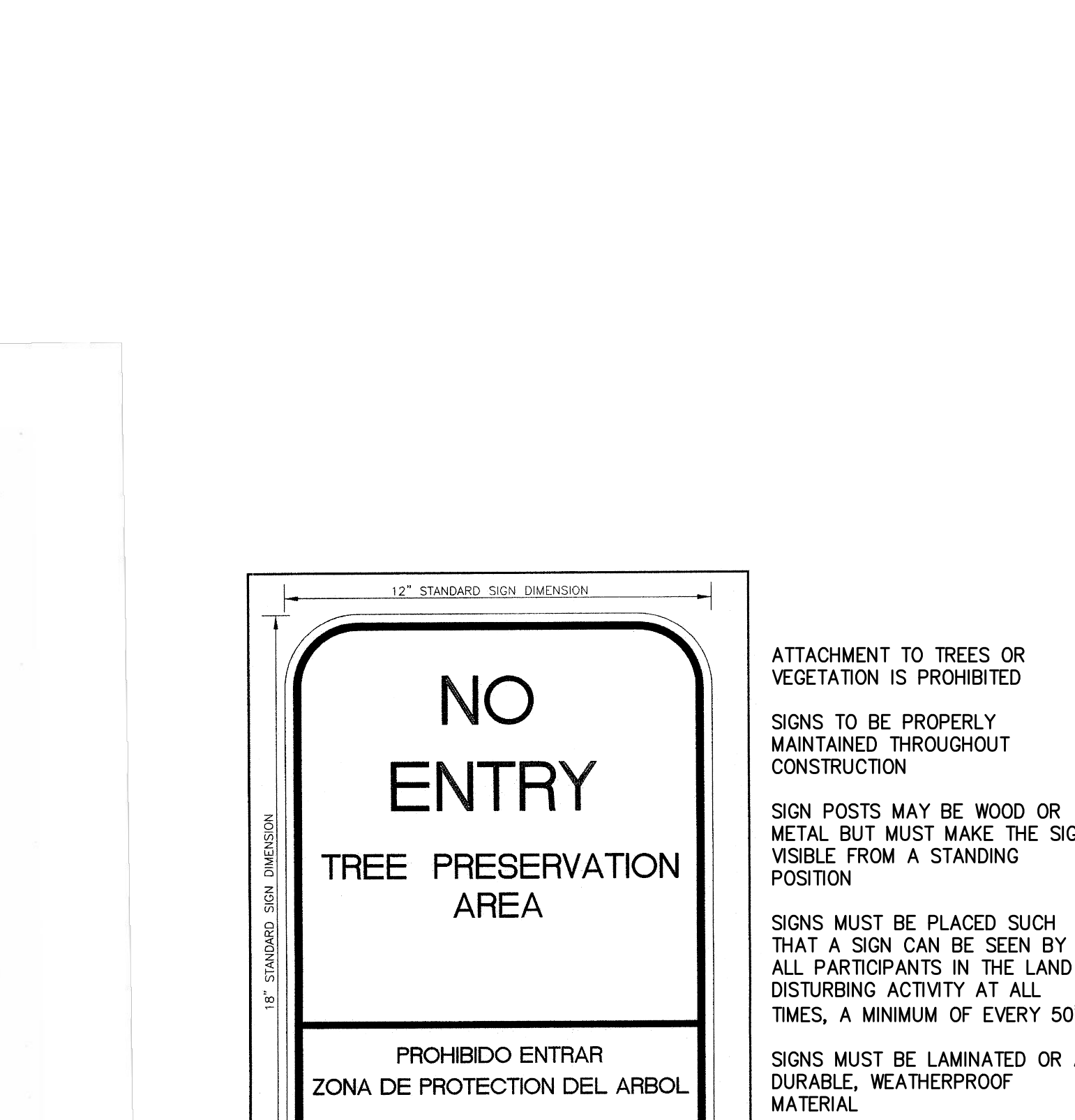
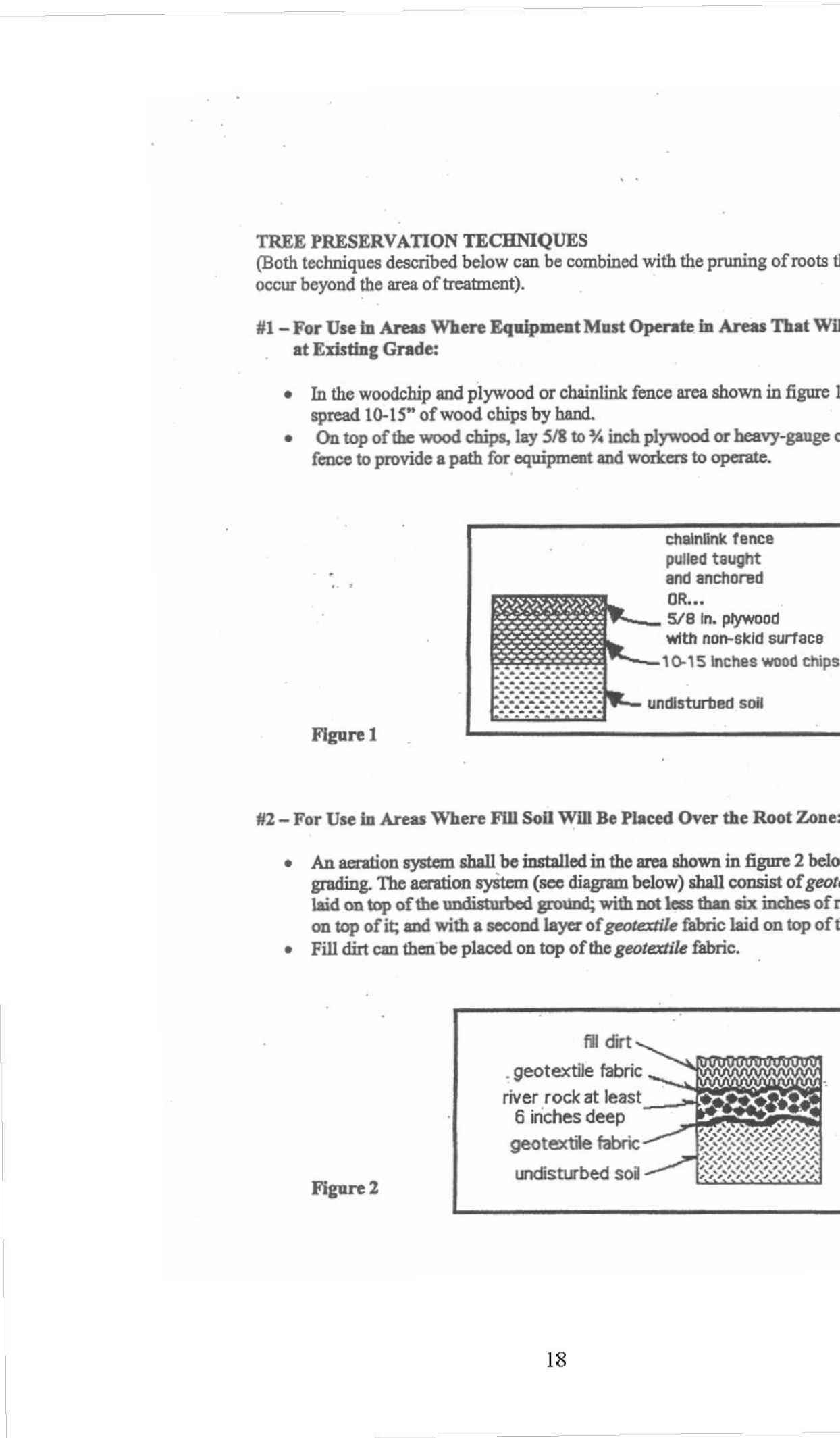
4. Erosion and sediment control fencing shall be placed on the inside (toward construction) from the tree preservation fencing and any root-pruning trenches. Erosion control devices such as silt fencing, debris basins, and water diversion structures shall be installed to prevent siltation and/or erosion within the tree protection zone. Property owners are advised to impose fines in contracts with construction companies if tree preservation measures are violated.

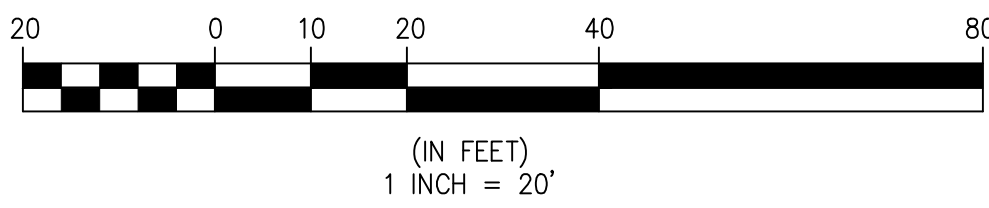
6. Pruning & Other Preservation Measures Specifications:
 - a. The City Arborist shall be notified a minimum of three (3) days in advance of commencing any form of tree work. Call 703-248-5183 for an appointment.
 - b. Root pruning, where required, shall be mechanically done with a narrow trencher with sharp blades. Once a trench is opened up, approximately 18-24" in depth and wide all exposed roots will be hand pruned so that the clean-cut ends can regrow.
 - The tree preservation fencing shall be placed 6-12" outside the root-pruning trench (construction side of the trench). The erosion and sediment fencing shall be placed outside the tree preservation fencing (construction side of the fence).
 - Where required, apply a slow-release complete fertilizer containing major and trace elements, but low in water-soluble nitrogen during the season before the commencement of construction. An application of a *mycorrhizae* product may also be required to assist in the preservation of highly stressed trees.
 - c. All trees to be saved will be pruned (in accordance with American National Standards Institute (ANSI) Standard Practices for Trees, Shrubs, and Other Woody Plant Maintenance ANSI A300 and adhere to the most recent edition of ANSI Z133.1.
 - d. Treat any disease or insect pest as required to reduce stress on trees.
 - e. Remove all invasive vines growing on trees and from the area around the trees
 - f. Specifications for work to be performed on individual trees shall be indicated under the "maintenance" column of the Tree Survey.
 - g. All trees within the project area shall be pruned to:
 - clear the crown of diseased, crossing, weak, and dead wood to a minimum size of 1 ½ inches diameter;
 - provide 14 feet of vertical clearance over streets and 8 feet over sidewalks;

- by cutting all roots cleanly to a depth of 24 inches to the maximum depth of root penetration, (usually 3 feet). Roots shall be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, narrow trencher with sharp blades, or other approved root-pruning equipment. Pruned roots shall be promptly covered with soil.
- f. Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw and promptly covered with moist soil.
- g. Soil from trenches, basements or other excavations shall not be placed within the tree protection zone, either temporarily or permanently. Soil stockpiles should be placed only in previously designated areas. No vehicles or construction equipment shall be parked in the tree protection zone.
- h. No burn piles or debris pits shall be placed within the tree protection zone. No ashes, debris or garbage may be dumped or buried within the tree protection zone. No materials of any kind shall be stored in the tree protection zone.
- i. Maintain fire-safe areas around fenced areas. Also, no heat sources, flames, ignition sources, or smoking is allowed near mulch of trees.
- j. A copy of the "approved plan" and TREE PRESERVATION PROCEDURES AND SPECIFICATIONS must be maintained on site at all times.
- k. All underground utilities and drain or irrigation lines shall be routed outside the tree protection zone. If lines must traverse the protection area, they shall be tunneled or bored under the tree(s) with the approval of the City Arborist.
- l. A licensed and bonded tree contractor must perform additional tree pruning required for clearance during construction under the direction of the City Arborist. Construction workers shall not be allowed to prune trees.
- m. Any herbicides placed under paving materials must be safe for use around trees and labeled for that use. Any pesticides used on site must be tree-safe and not easily transported by water.
- n. If injury should occur to any tree during construction, it should be treated as soon as possible under the direction of the City Arborist.
- o. The City Arborist must monitor any grading, construction, demolition, or other work that is expected to encounter tree roots.
- p. At the completion of construction (and all equipment has been removed from site), notify the City Arborist for an inspection before removing the tree preservation fencing. At this time, all trees will be inspected and any repairs needed will be stipulated by the City and promptly made by the Contractor. (Refer to Sec. 35-15(b) of the City Code for guidance on finalizing the requirements of the bond agreement.

- If you have questions on any of the “procedures” or “specifications” noted above or concerns that may arise during construction, please contact the City Arborist at (703) 248-5183 or the Senior Urban Forester at (703) 248-5016.**

PRIOR TO THE SIGN OFF AND SUBSEQUENT RELEASE OF THE GRADING PLAN. ALL PRESERVATION MEASURES REQUIRED, AS PART OF THE LANDSCAPE MITIGATION PLAN, MUST BE APPROVED AND APPROVED BY THE CITY OF FALLS CHURCH ARBORIST. THIS MAY INCLUDE BUT IS NOT LIMITED TO TREE WORK, FENCING, MULCHING AND ROOT PRUNING. VIOLATIONS OF THE LANDSCAPE MITIGATION PLAN SHALL RESULT IN FINES, STOP WORK ORDERS, AND/OR THE RESUBMISSION OF A "MITIGATION PLAN". THE REQUIRED REPLACEMENT/VEGETATION SHALL BE INSPECTED PRIOR TO PLANTING BY THE CITY ARBORIST. VEGETATION THAT IS INADEQUATE OR NOT APPROVED SHALL BE REJECTED. TO ARRANGE AN APPOINTMENT CALL THE SENIOR URBAN FORESTER (703) 248-5016.






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PLANT SCHEDULE : TREES						
KEY	BOTANICAL NAME / COMMON NAME	MIN. SIZE	QUANTITY	COVERAGE		COMMENTS
				UNIT	TOTAL	
AA	AMALANCHIER ARBOREA SERVICEBERRY	8" TALL B&B	3	100	300	3-4 STEMS NATIVE CREDIT
AR	ACER RUBRUM RED MAPLE	2.5" CAL. B&B	3	175	525	ENERGY CONSERVATION CREDIT; NATIVE CREDIT
BN	BETULA NIGRA 'HERITAGE' RIVER BIRCH	8" TALL B&B	3	175	525	3-4 STEMS
CC	CERCIS CANADENSIS 'FOREST PANSY' 'FOREST PANSY' REDBUD	1.75" CAL. B&B	4	100	400	SINGLE STEM
CJ	CRYPTOMERIA JAPONICA 'RADICANS' CRYPTOMERIA	8" TALL B&B	10	25	250	
IF	ILEX 'ATTENUATA 'FOSTERI' FOSTER HOLLY	8" TALL B&B	21	25	525	
JV	JUNIPERUS VIRGINIANA EASTERN REDCEDAR	8" TALL B&B	11	25	275	NATIVE CREDIT
MG	MAGNOLIA GRANDIFOLIA 'LITTLE GEM' LITTLE GEM SOUTHERN MAGNOLIA	8" TALL B&B	17	25	425	
MV	MAGNOLIA VIRGINIANA SWETBAY MAGNOLIA	8" TALL B&B	4	100	400	3-4 STEMS NATIVE CREDIT
NS	NYSSA SYLVATICA BLACK GUM	2.5" CAL. B&B	4	125	500	ENERGY CONSERVATION CREDIT; NATIVE CREDIT
PO	PLATANUS OCCIDENTALIS AMERICAN SYCAMORE	2.5" CAL. B&B	3	175	525	(2) ENERGY CONSERVATION CREDIT; NATIVE CREDIT
QB	QUERCUS BICOLOR SWAMP WHITE OAK	2.5" CAL. B&B	7	175	1225	NATIVE CREDIT
QP	QUERCUS MONTANA CHESTNUT OAK	2.5" CAL. B&B	10	175	1750	NATIVE CREDIT
TG	THUJA 'GREEN GIANT' GREEN GIANT ARBORVITAE	8" TALL B&B	20	25	500	
TOTAL:				8125		

CREDITS	
25% NATIVE PLANT SPECIES	1375 SF
25% ENERGY CONSERVATION	344 SF
10% DIVERSITY BONUS	813 SF
	2531 SF
PROPOSED CANOPY	
2531 SF + 8125 SF =	10656 SF
TOTAL CANOPY	
10656 SF + 1563 SF =	12219 SF

LEGEND

	PROPOSED DECIDUOUS TREES
	PROPOSED UNDERSTORY TREE
	PROPOSED EVERGREEN TREE
	PROPOSED SHRUBS
	LIMITS OF CLEARING AND GRADING

LANDSCAPE PLAN

RAILROAD COTTAGES
CITY OF FALLS CHURCH, VIRGINIA



WALTER L. PHILLIPS
INCORPORATED
 ESTABLISHED 1945
 SCALE: "1" = 20' DATE: 9/12/2017, 10/20/2017, 11/6/2017, 12/12/2017

Engineers • Surveyors • Planners
Landscape Architects • Arborists
207 PARK AVENUE
FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 Fax (703) 533-1301
www.WLPINC.com





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A

SPECIFICATIONS FOR PLANTING
City of Falls Church, VA – Urban Forestry / Development Services

- Contractor shall verify existing conditions and utility locations. The City Arborist prior to the planting must approve adjustments to locations of plant material due to field conditions. Any substitutions in plant material and sizes specified will not be accepted, unless approved by the City Arborist prior to installation.
- All plant material shall conform to the American Standard for Nursery, latest edition, published by the American Nursery and Landscape Association. All plants must be free from injury, insect infestations and disease. All plant material must be inspected by the City Arborist prior to planting. The Contractor shall phone at least three (3) days prior to installation for inspection of the material and for inspection of the planting operation.
- All plant material must bear original nursery tags indicating the genus, species and if applicable, cultivars and variety. All tags shall be removed after the City Arborist has inspected the plant material.
- Test soil drainage before planting. Dig a hole as deep as your planting hole and fill with water. If water drains at a rate less than one inch per hour, install drainage to carry water away from the planting hole base, or moving or raising the planting site (bern construction)
- Examine soil for compaction before planting. If soils are compacted in an area where a group of plants are to be installed, incorporated several inches of a combination of organic materials such as composted yard waste, finely shredded pine bark mulch (*superfines*) or shredded, composted leaf mulch (*leaf-gro*) and till to a depth of twelve (12) to eighteen (18) inches over the entire area. Do not till if planting is within a tree preservation area. Apply the organic matter at a rate of one-quarter organic matter to three-quarters existing soil. Do not incorporate small quantities of sand – compaction will increase and drainage decreases. For single tree plantings, backfill planting holes with unamended soil. Increase the width of the top of the planting hole in area where soil has been compacted. Do not incorporate organic matter such as peat moss into backfill for individual planting holes.
- Tree pits shall be a minimum of two (2) and a half (1/2) times the width of the root ball and no deeper than the height of the root ball. On balled and burlaped trees, remove pinning nails or rope lacing, then cut away the wrapping and then backfill. Remove the top 12" of the wire basket. Remove all rope, whether jute or nylon, from trunks. For container materials, remove the container completely. Select trees grown in containers with vertical ribs or a copper-treatment on the interior wall. These container modification and treatments minimize circling root formation. If roots are circling around the root ball exterior of container plants (trees, shrubs or perennials) cut through the roots and soil in a few places.

Container tree with multiple circling roots will be rejected. Place shrubs and perennials at the same depth they were in the containers. For bare root perennials plant with the soil even with the top of the crown. Dig the hole wide enough to allow the roots to spread out in the soil. Push the soil back into the hole over the roots and around the top of the plant.

- A soil test shall be made and the results submitted to the City Arborist prior to the installation of the plant material.

For trees: A slow-release granular fertilizer shall be incorporated into the top four (4) inches of backfill soil to provide nitrogen, or if a soil test indicated a need for phosphorus or potassium. Use no more than 1 lb. Actual nitrogen per 1,000 ft. of planting hole surface. (Example – if using 18-6-12 with a 5' diameter hole, incorporate 0.3 oz. per planting hole.)

For shrubs: A slow-release granular fertilizer shall be incorporated into the top four (4) inches of backfill soil to provide nitrogen, or if a soil test indicates a need for phosphorus or potassium. Use quantities in accordance with manufacturer's direction.

For perennials, bulbs and annuals: A slow –release high phosphate fertilizer such as 7-40-6 or approved equal shall be incorporated into the top four (4) inches of the backfill mix. Alternatively, use Plant-tone on approved equal for sun perennials, together with rock phosphate at rates in accordance with manufacturers directions. Alternatively, for shade perennials use Hollytone or approved equal, together with super phosphate at a rate in accordance with manufacturers directions. Use gypsum, a soil conditioner, for clay soils. For bulbs commercial raw finely ground Bone Meal with an analysis of 4% nitrogen and %20 phosphorus acid shall be incorporated into the backfill mix.

- When half of the backfill has been returned to the planting hole, water shall be applied to provide settlement and eliminate air pockets. The tree shall be thoroughly watered again after the remaining soil has been placed in the planting pit. A three (3) to four (4) inch dam of soil shall be constructed around the planting pit.
- Two (2) to three (3) inches of mulch shall be placed over the tree-planting pit, but shall be kept three (3) to four (4) inches away from the trunk of the tree or crowns of shrubs. Do not allow mulch to touch the trunks of trees or crowns of shrubs. Use mulch that is compatible with the type of plant used. Avoid mulch that has not been nitrogen composted, as the pH of the soil could change as the mulch degrades. Pine bark mulch will not change the pH of the soil as it degrades. This is the best type of mulch for use with perennials. In mulching perennials, use no more than 1-2". For Mediterranean type of perennials, such as lavender, or for peonies or iris, use no mulch at all.

- Trees shall be planted at the height of the surrounding grade with root flares visible. Should soil have been piled over the root flare during the digging process, this soil shall be removed so that the flare is slightly above grade.

- Any pruning must be done with the approval of the City Arborist. Pruning at the time of planting shall be done only to remove broken branches or double (co dominant) leaders.

- Remove tags and labels from trees and shrubs to prevent girdling branches and trunks.

- Stakes shall be used only in area of high traffic or highly windy locations. A tree-staking diagram should be provided if staking is necessary. Stake for maximum of one year. Allow trees a slight amount of flex rather than holding them rigidly in place. Use guying or attaching that won't damage the bark. To prevent trunk girdling, remove all guying material after one year.

- Use tree wrap only on thin barked trees planted in spring or summer into hot or paved areas. In these instances use white wrap, attaching with out the use of wire, rope, ties or tape, and remove after one year.

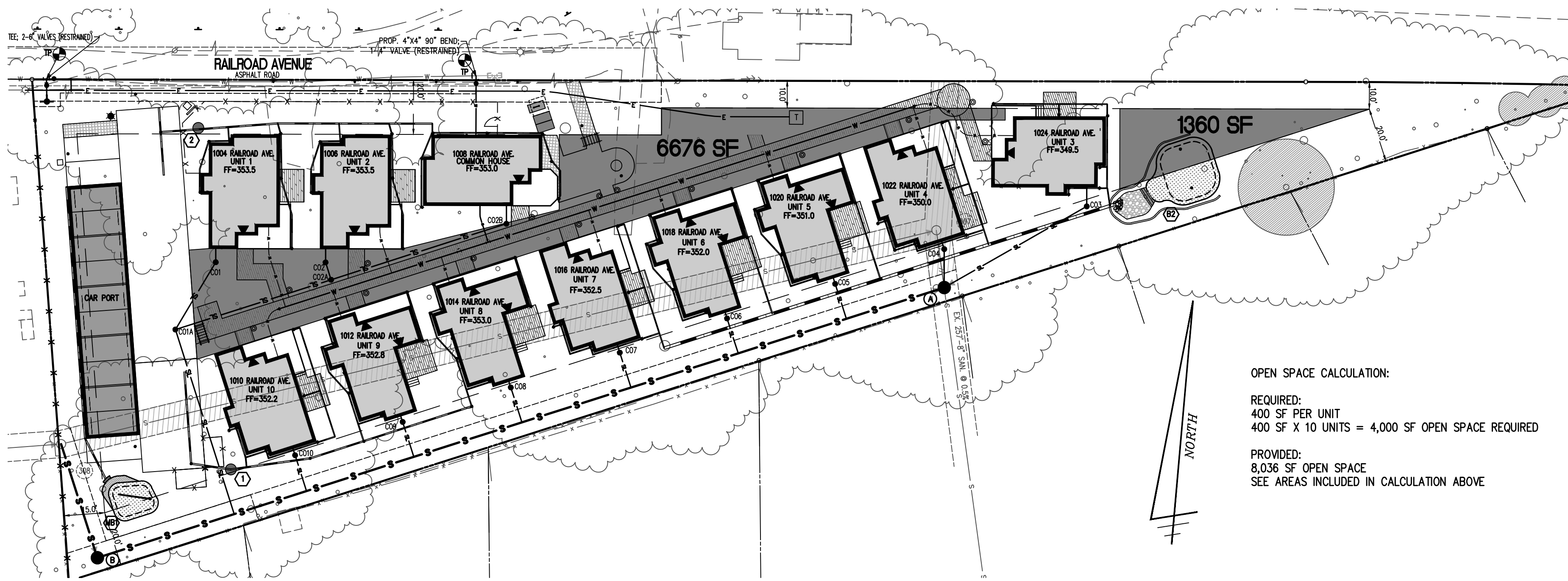
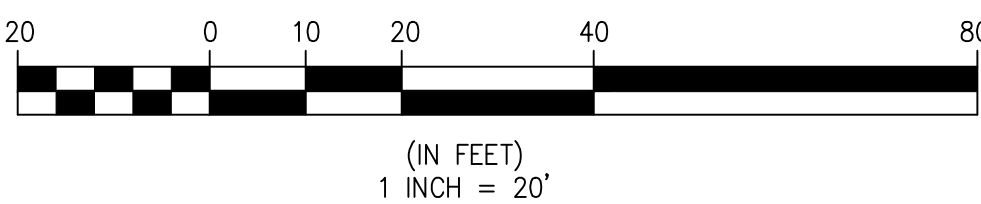
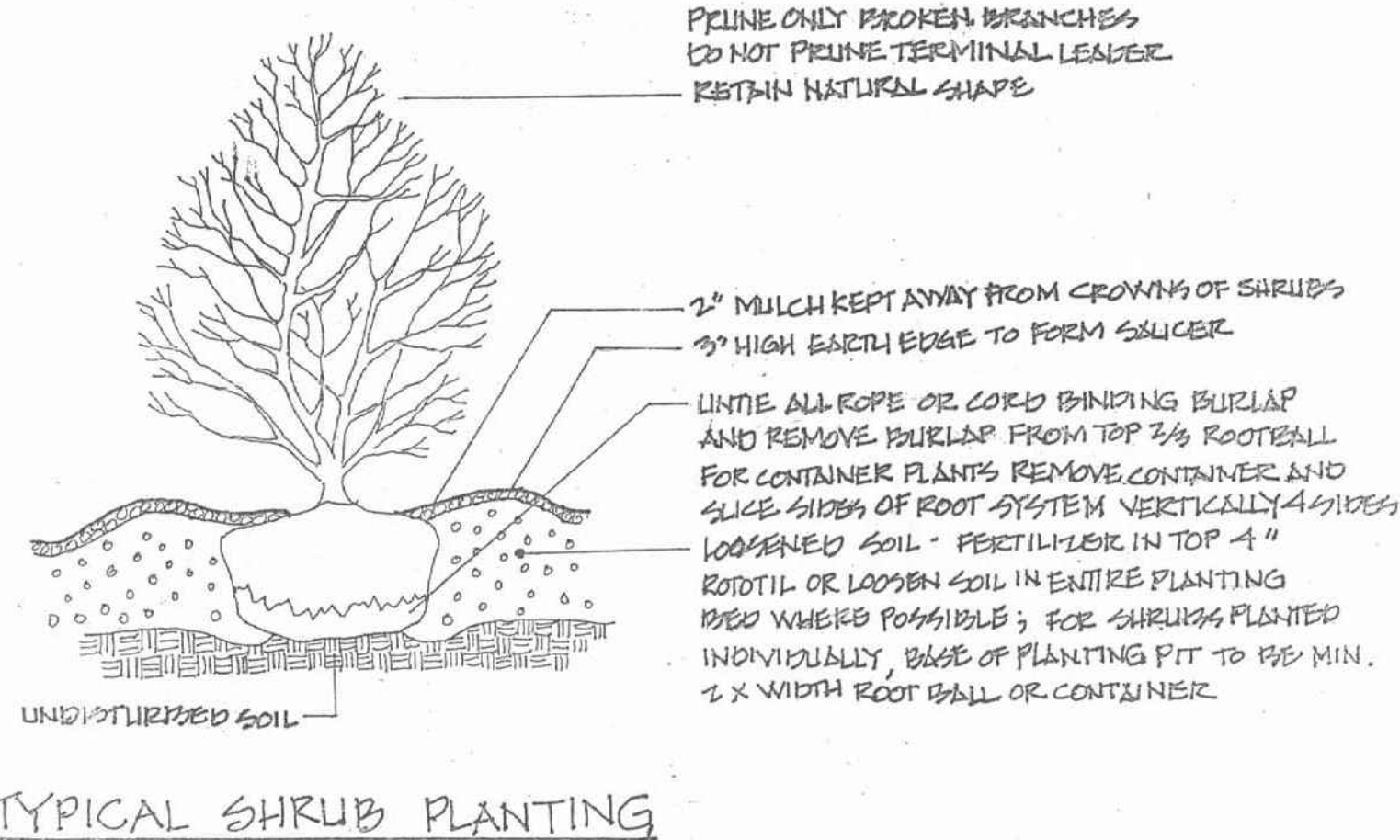
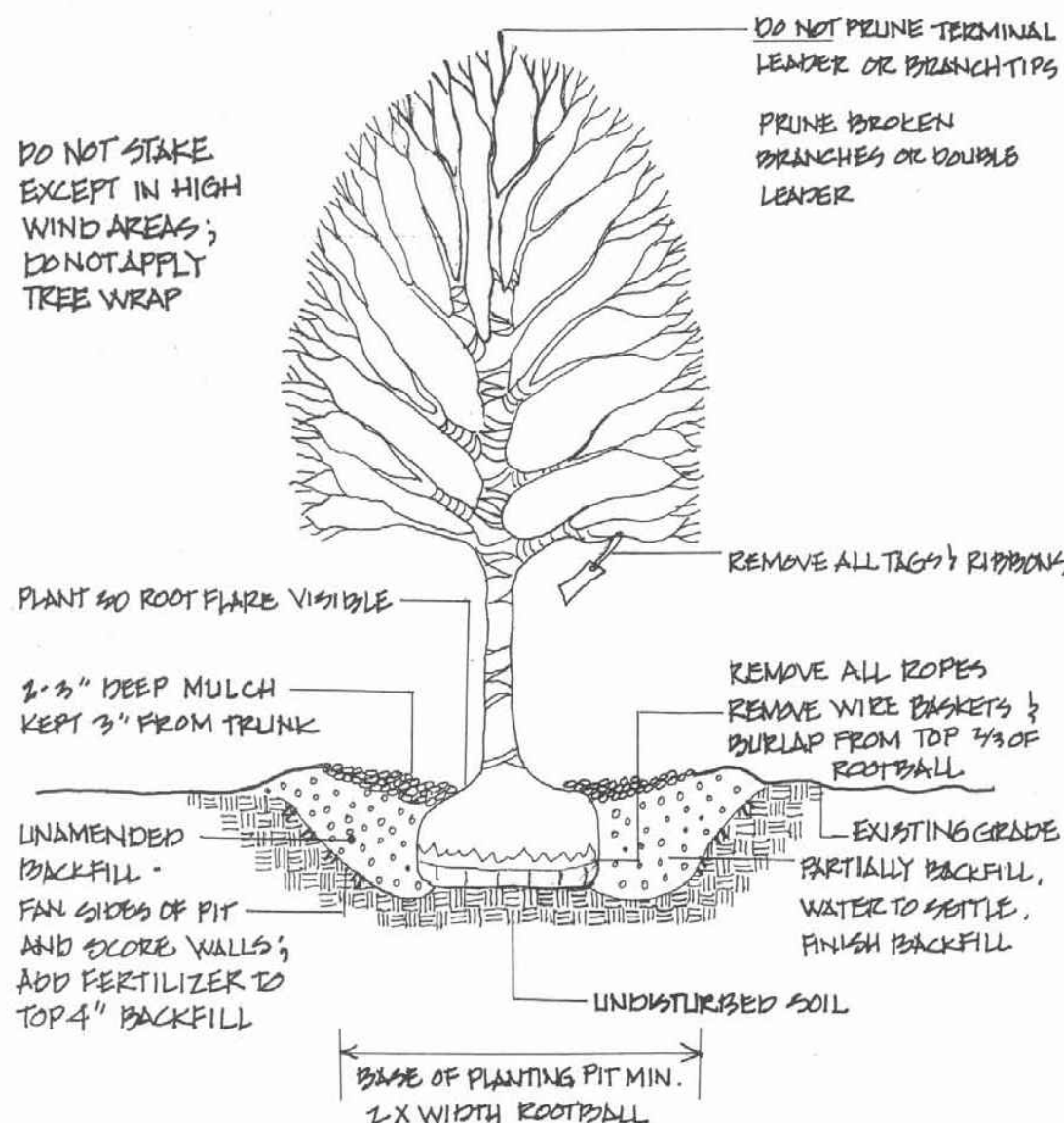
- Planting Season – Planting shall be done only within the following dates:

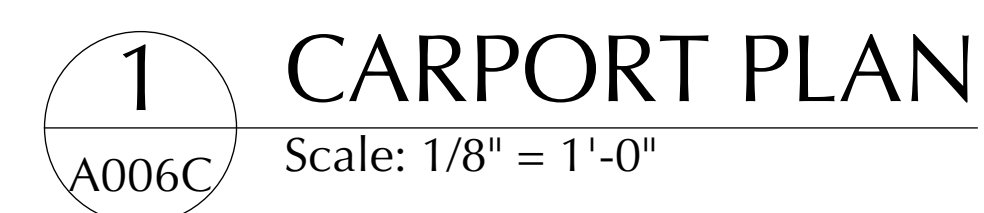
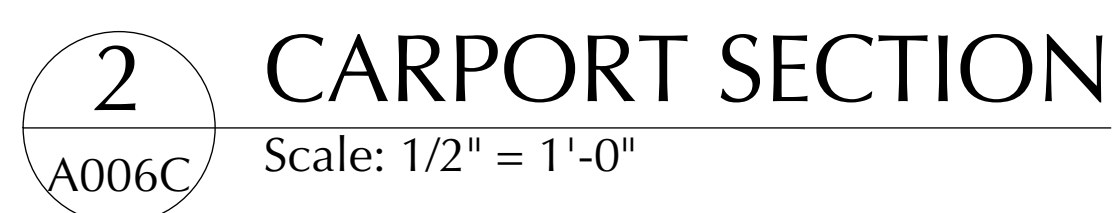
- Deciduous Trees – March 15 to May 30 or September 15 to December 15 (oaks and black gum to be spring dug and planted only).
- Evergreen Trees – March 1 to May 15 or September 15 to November 15.

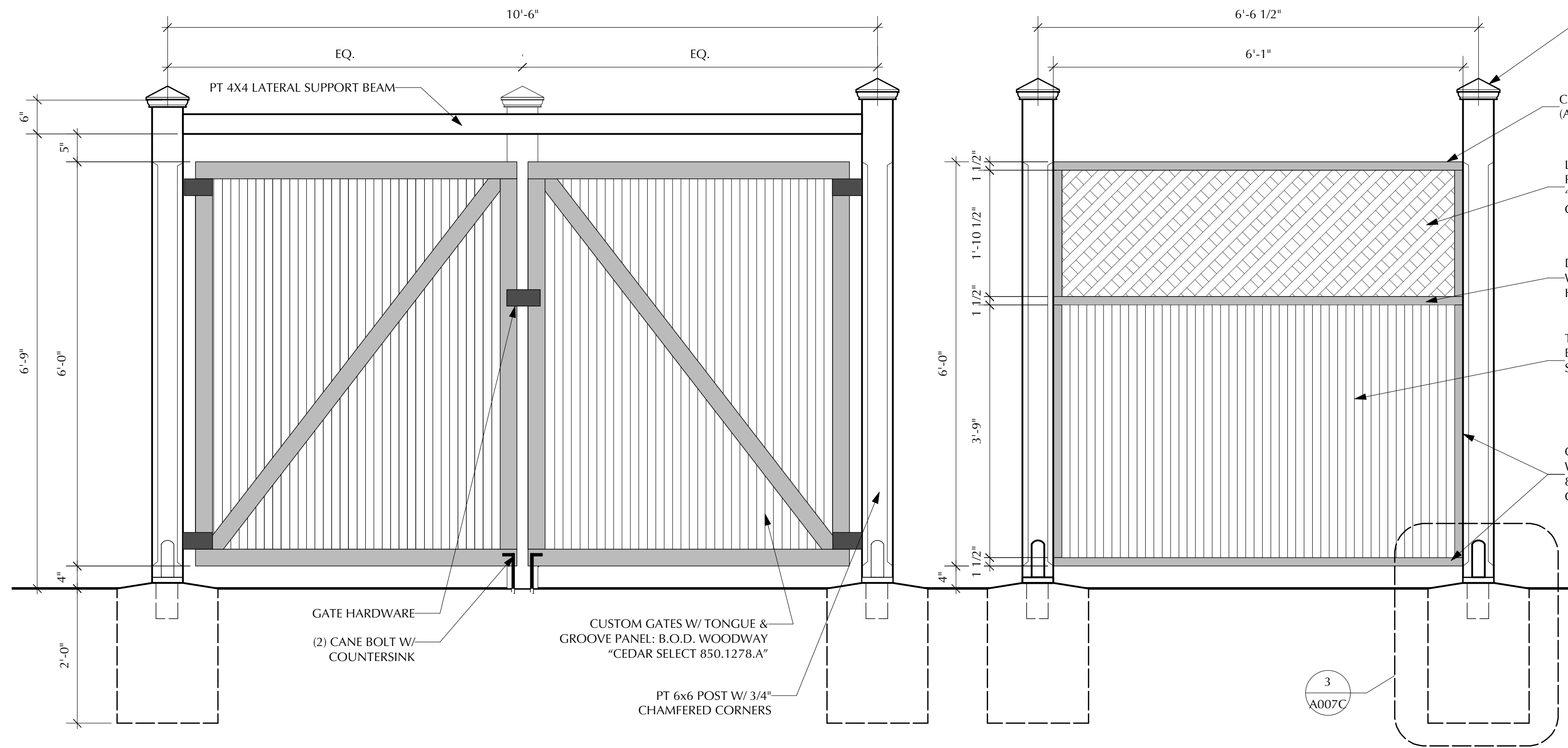
- All plant material shall be guaranteed by the Contractor for one year from the date of acceptance to be in good, healthy and flourishing condition. In the event that a plant dies or in the judgment of the City Arborist, fails to flourish; the Contractor shall replace in accordance with the above noted specifications.

- The Contractor shall be responsible for the maintenance of the plants during this one-year warranty period. This maintenance shall include providing water on a weekly basis when natural rainfall is less than one inch a week. Drip irrigation systems and water reservoir devices can facilitate watering. Root balls of trees should be slowly and thoroughly soaked at time of watering. For planting beds (i.e., trees, shrubs and perennials), water slowly and deeply putting down 1"-2" of water in a 6-12 hour period. This should give a penetration of 12-18" depth.

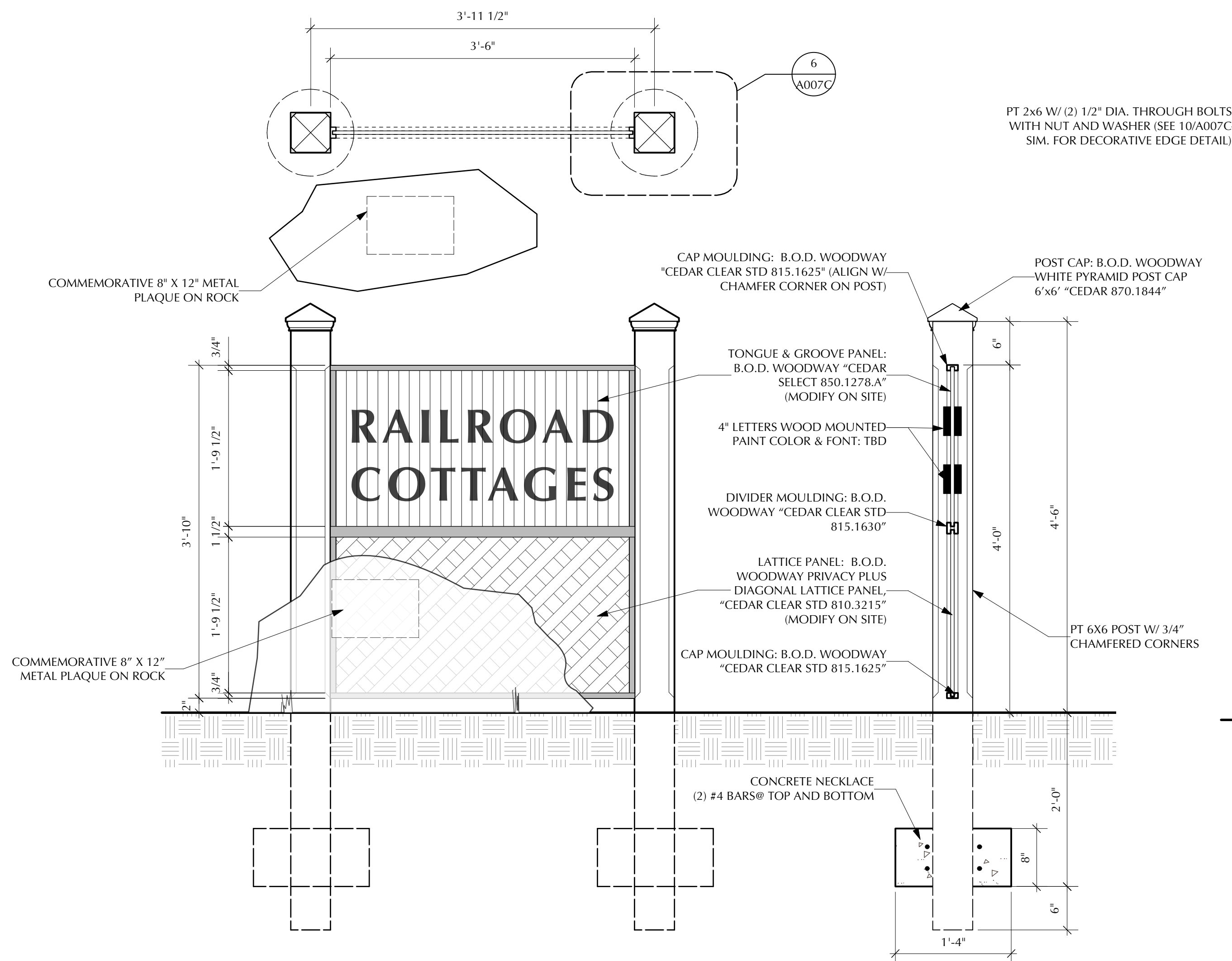
TREE PLANTING DETAIL



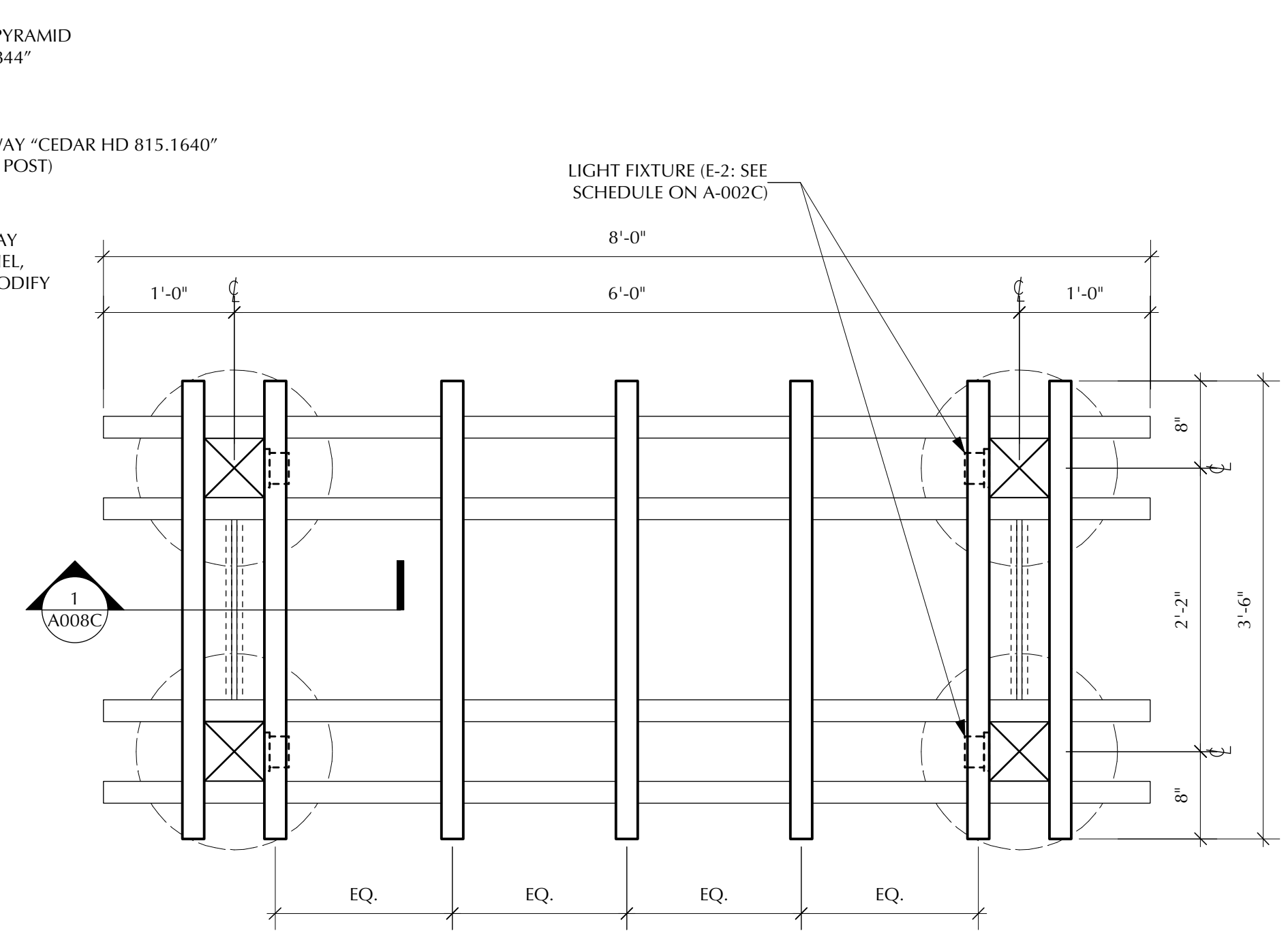




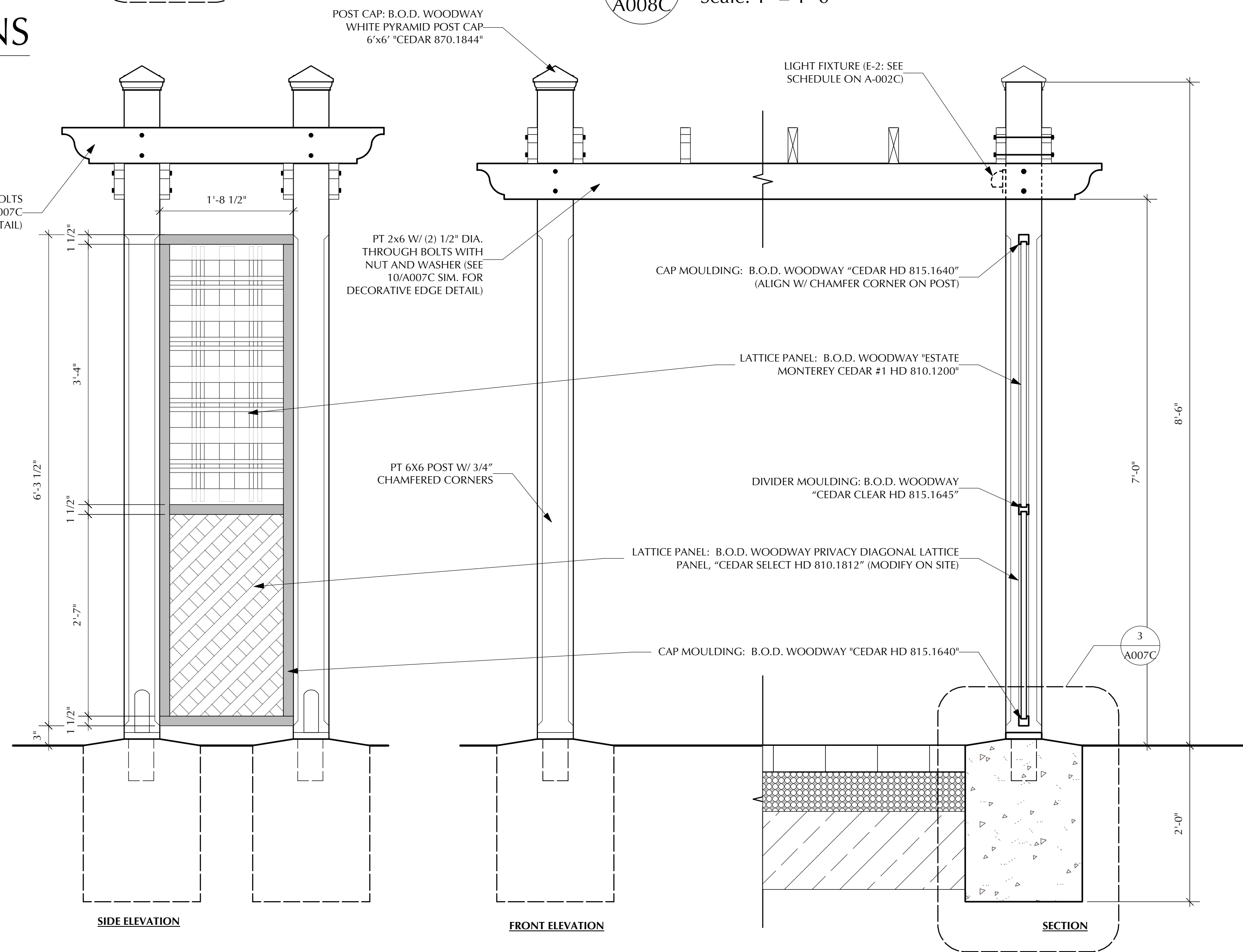
4 TRASH & RECYCLING ENCLOSURE ELEVATIONS
A008C Scale: 3/4" = 1'-0"



2 ENTRANCE SIGN PLAN/ ELEVATION/ SECTION
A008C Scale: 1" = 1'-0"



3 PERGOLA PLAN
A008C Scale: 1" = 1'-0"



1 PERGOLA ELEVATION / SECTION
A008C Scale: 1" = 1'-0"

ISSUE DATE:

A Permit Set 11/03/17

REVISION DATE:

RAILROAD COTTAGES

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


















**SITE
FEATURES**

A-008C

8 OF 37

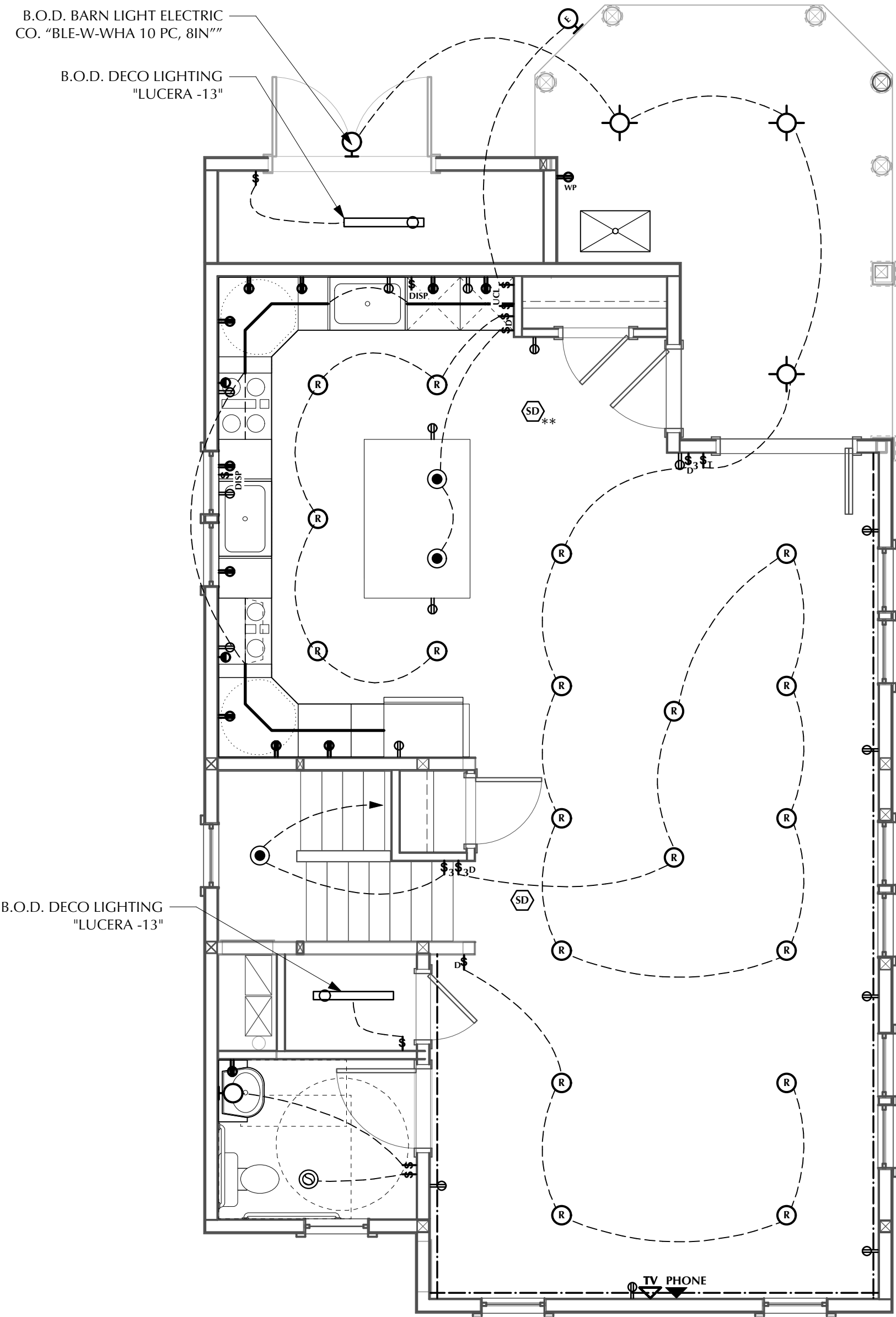
16054

ELECTRICAL SYMBOLS LIST:

	RECESSED DOWN LIGHT		DUPLEX OUTLET
	UNDERCABINET LED STRIP LIGHTING		WATERPROOF OUTLET
	LED TUBE LIGHTING		GFI OUTLET, 42" A.F.F.
	PENDANT LIGHTING		DESIGNATED APPLIANCE OUTLET
	CEILING MOUNTED SURFACE LIGHT		SINGLE POLE SWITCH
	WALL SCONCE		SINGLE POLE SWITCH ('D' SUBSCRIPT INDICATES DIMMER)
	EMERGENCY STROBE, SURFACE MOUNTED FACE OF HOUSE		SINGLE POLE SWITCH ('T' SUBSCRIPT INDICATES TIMER)
	CEILING MOUNTED FAN / LIGHT		3-WAY SWITCH
	SMOKE DETECTOR, HARDWIRED THROUGH HOUSE		TV WIRING
	** W/ CARBON MONOXIDE DETECTOR		PHONE WIRING

FRAMING NOTE:
1. OUTSIDE OF WALL SHEATHING ALIGNS WITH OUTSIDE OF 10" CONCRETE FOUNDATION WALLS, THEREFORE WALL PLATES SHOULD BE OFFSET FROM OUTSIDE OF 10" FOUNDATION WALLS TO ACCOMMODATE WALL SHEATHING. (SEE 1/A501)
2. (3) 2x8s OR (2) 2X12s HEADERS @ OPENINGS, TYP. UNLESS OTHERWISE NOTED.
3. LVL BEAMS: 1/2" MACHINE BOLTS @ 24" O.C. MAX STAGGERED
4. TWO STUD CORNERS AND LADDER T-WALLS AT ALL LOCATION.

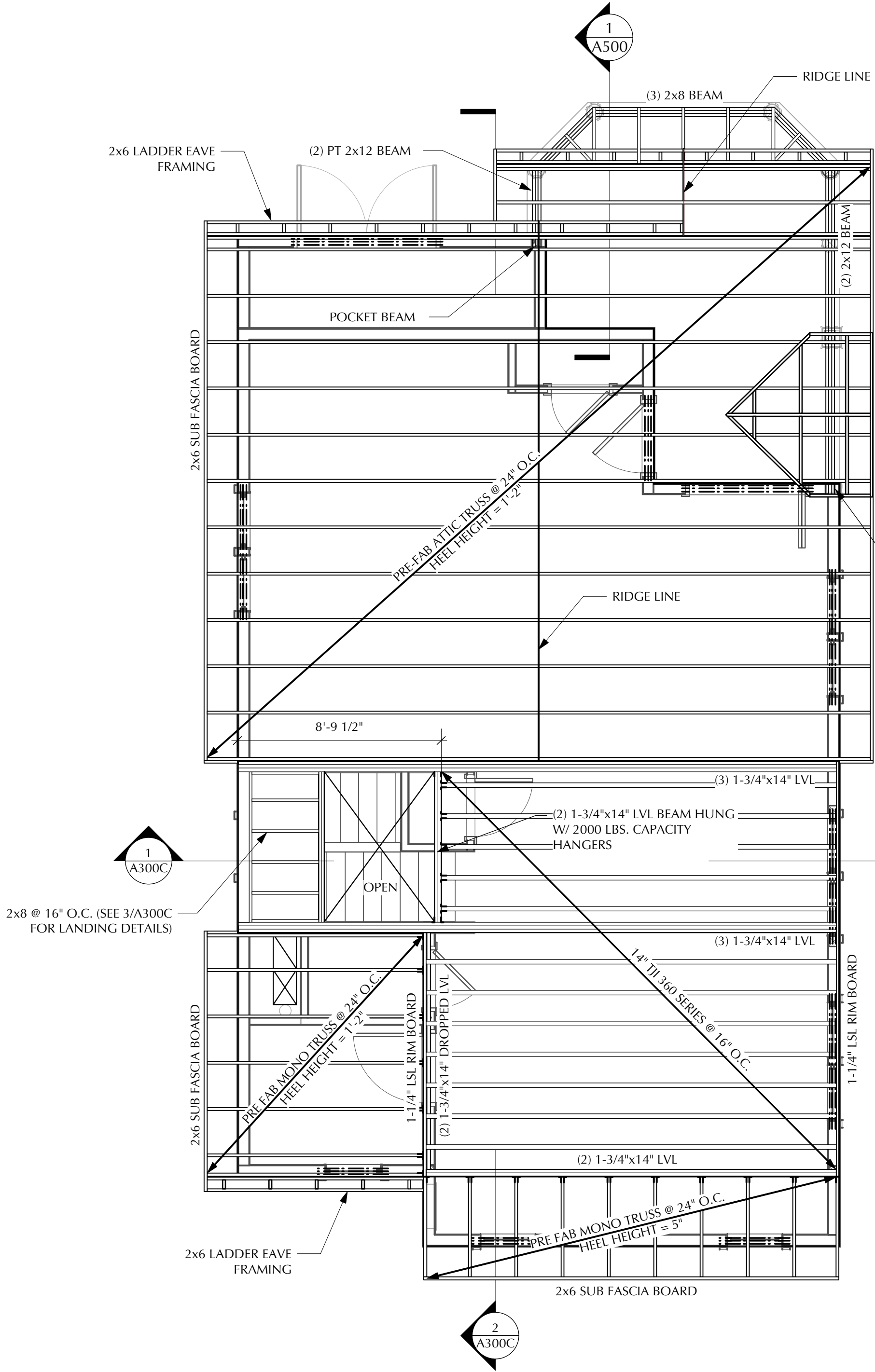
WALL BRACING KEY:
CS-WSP = CONTINUOUS WOOD STRUCTURAL PANEL SHEATHING, TYP. (SEE SHEET S-071)
CS-PF = CONTINUOUS PORTAL FRAME, TYP. (SEE SHEET S-071)



ELECTRICAL NOTE:
1. ALL EXTERIOR LIGHT FIXTURES TO BE ENERGY STAR RATED

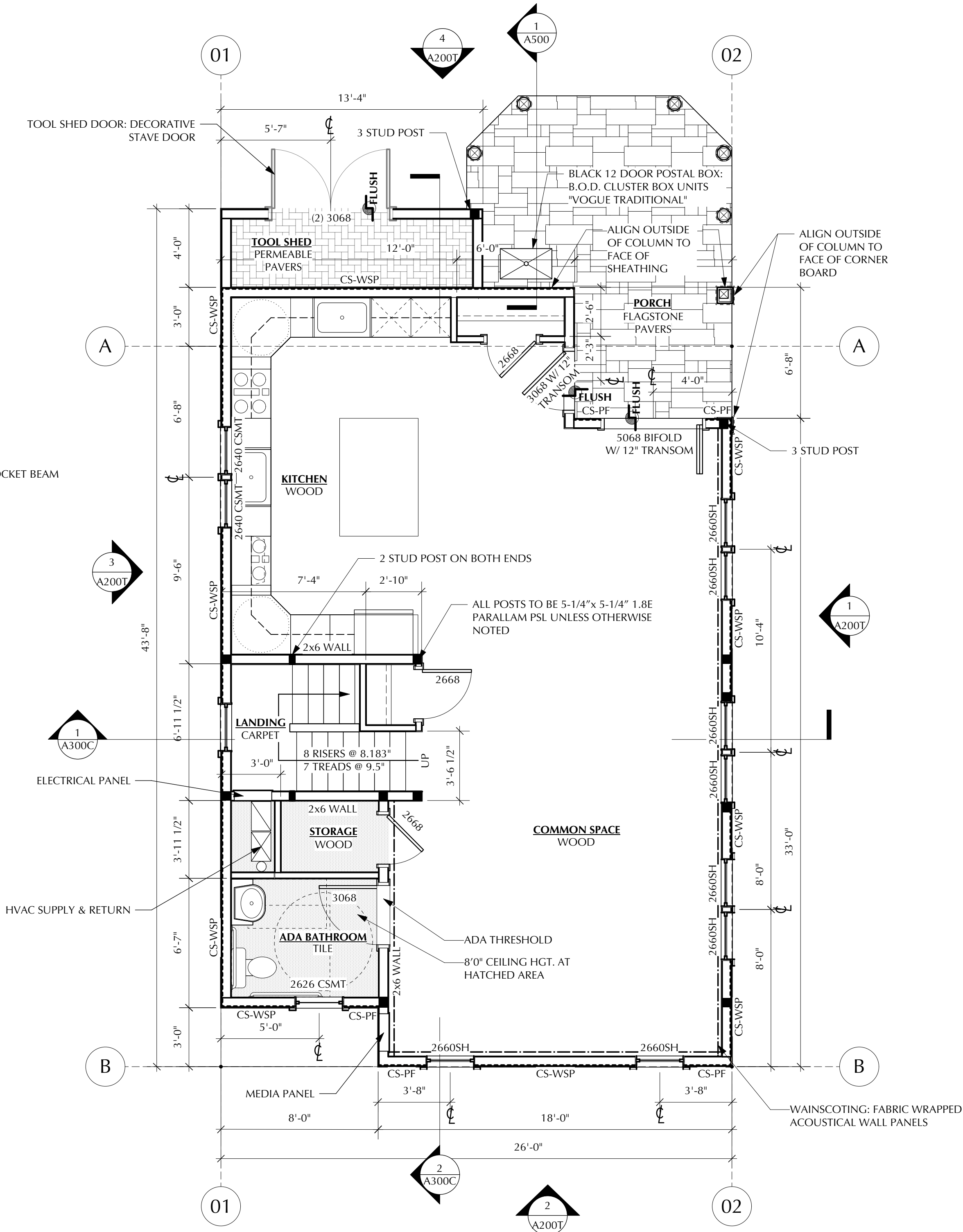
3 FIRST FLOOR ELECTRICAL PLAN

A-101C Scale: 1/4" = 1'-0"



2 1ST FLOOR ROOF PLAN & 2ND FLOOR FRAMING PLAN

A-101C Scale: 1/4" = 1'-0"



1 FIRST FLOOR PLAN / WALL BRACING

A-101C Scale: 1/4" = 1'-0"

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









FIRST FLOOR
PLANS

A-101C

10 OF 37

16054

	RECESSED DOWN LIGHT
	UNDERCABINET LED STRIP LIGHTING
	LED TUBE LIGHTING
	PENDANT LIGHTING
	CEILING MOUNTED SURFACE LIGHT
	WALL SCONCE
	EMERGENCY STROBE, SURFACE MOUNTED FACE OF HOUSE
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	** W/ CARBON MONOXIDE DETECTOR

- | | |
|---|---|
|  | DUPLEX OUTLET |
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|  | GFI OUTLET, 42" A.F.F. |
|  | DESIGNATED APPLIANCE OUTLET |
|  | SINGLE POLE SWITCH |
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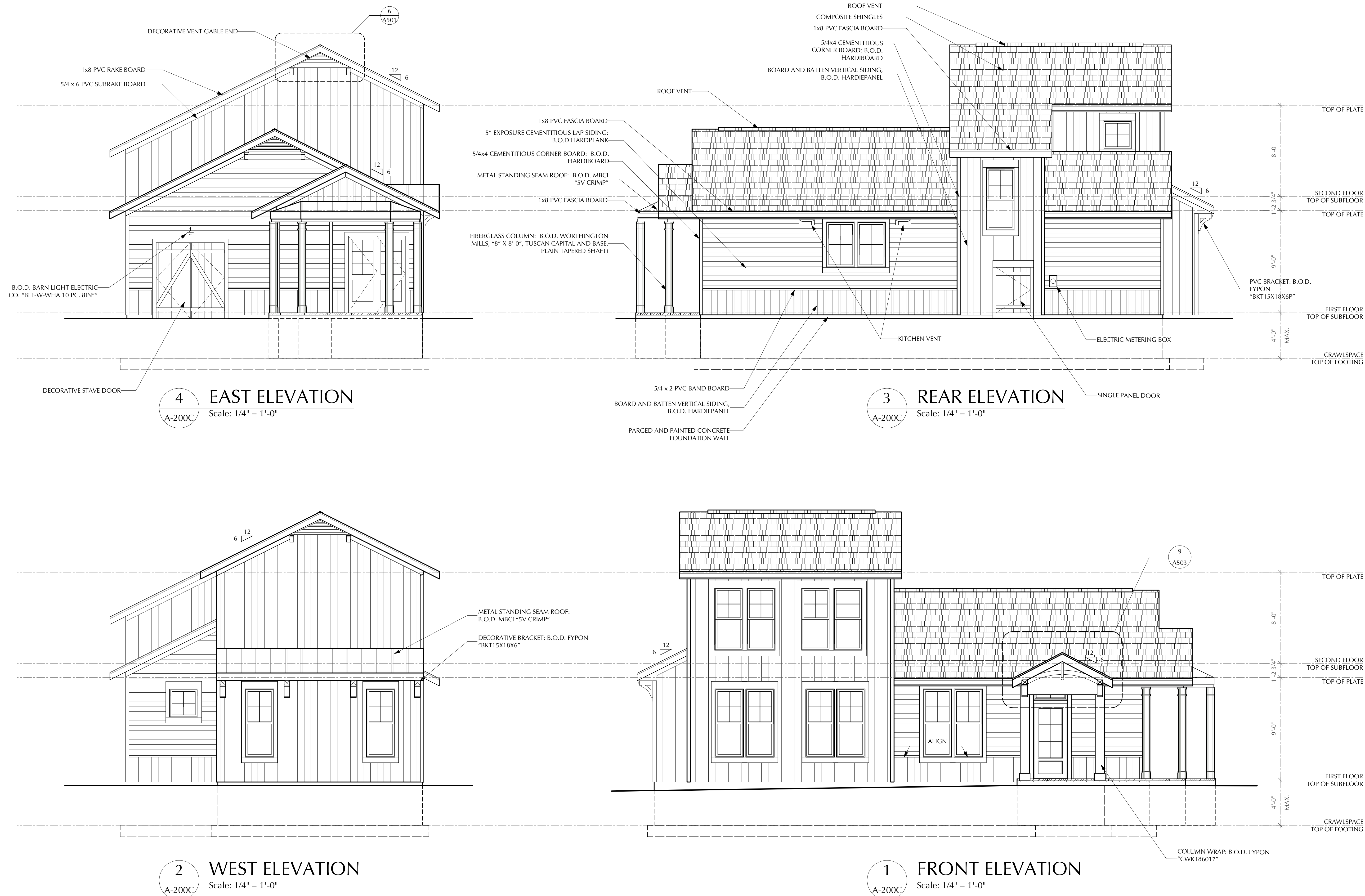
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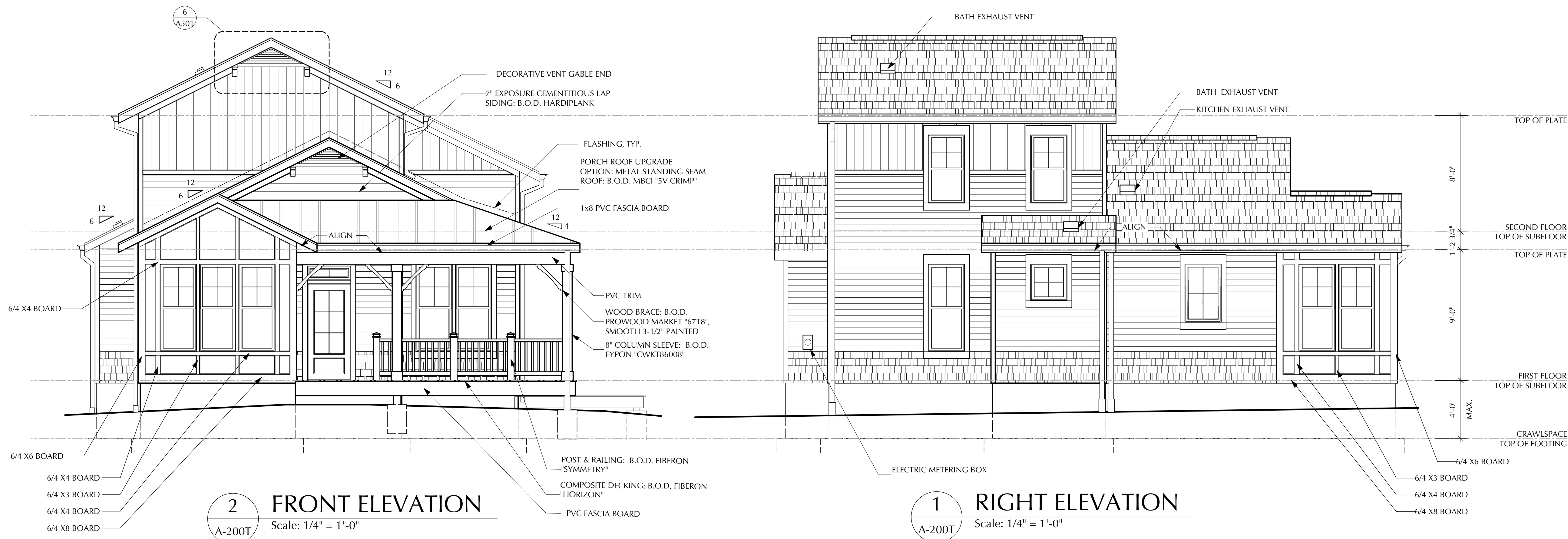
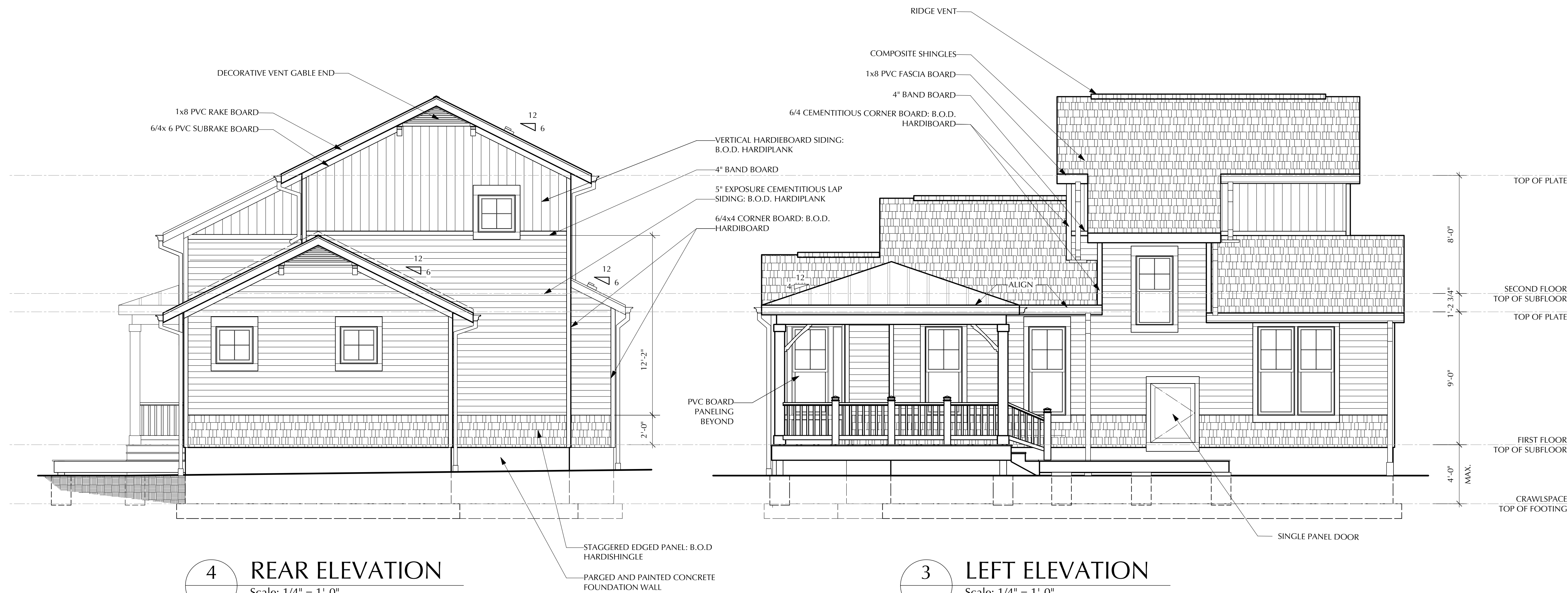
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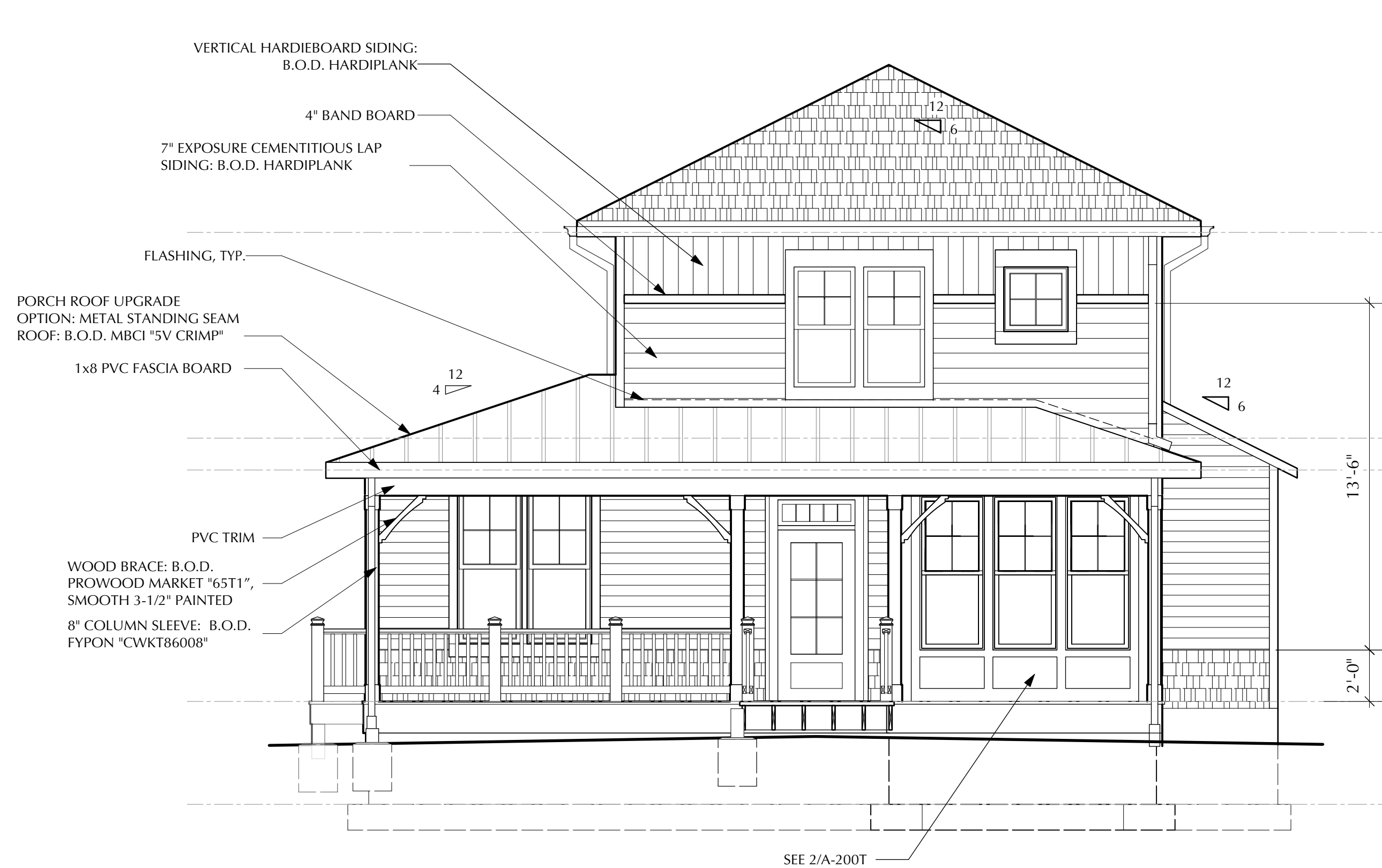
ELEVATIONS

A-200C

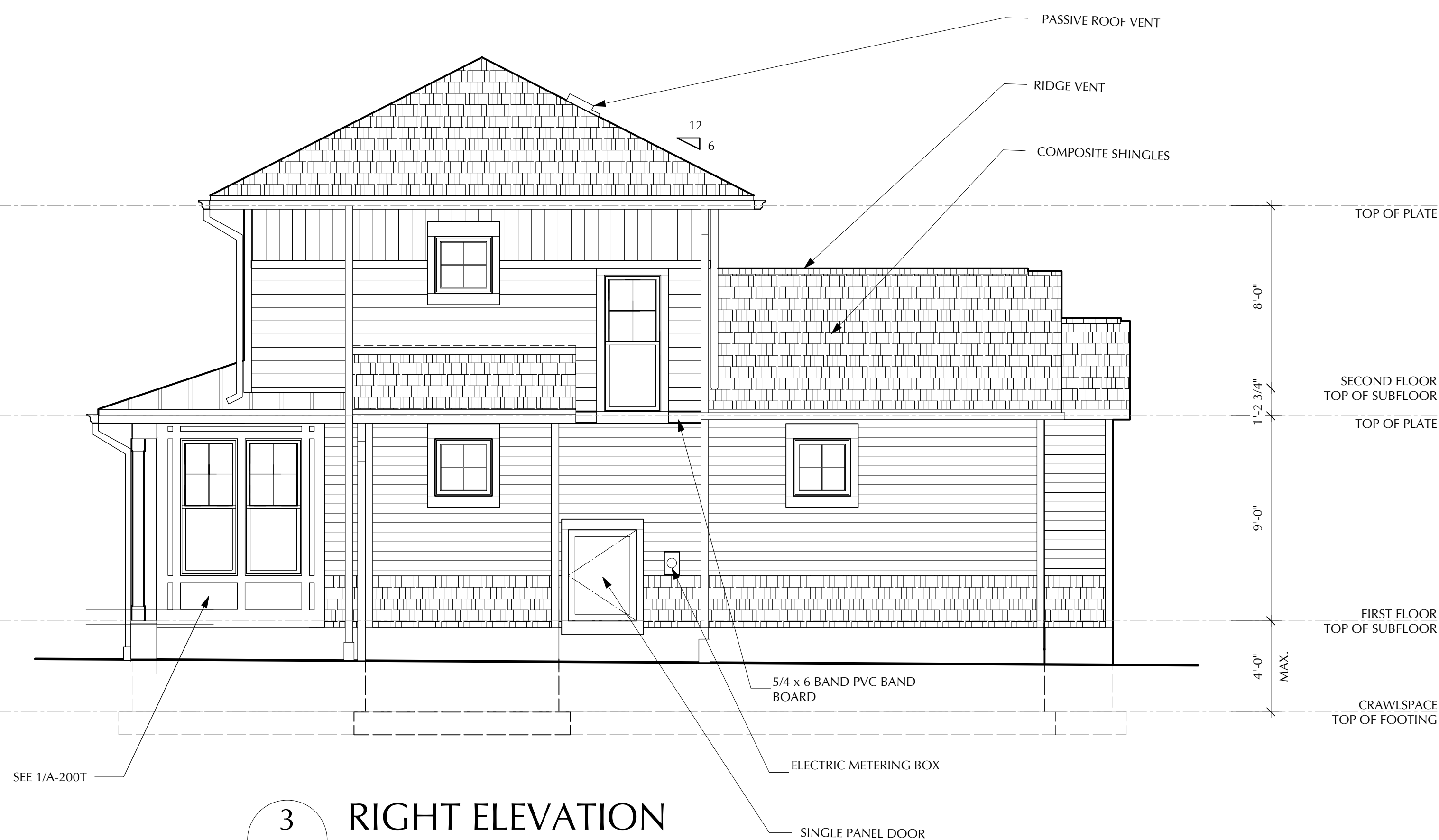
13 OF 37



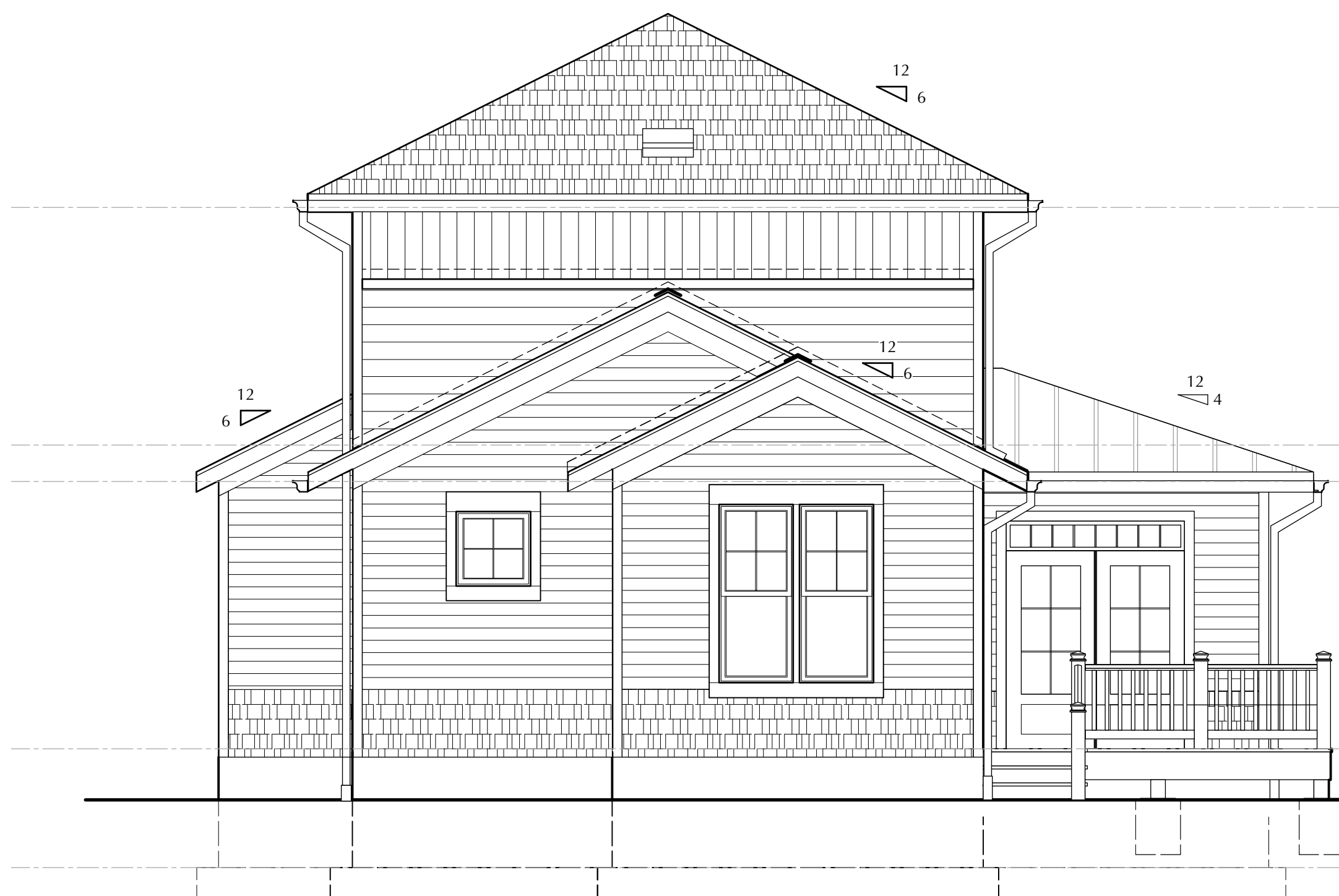




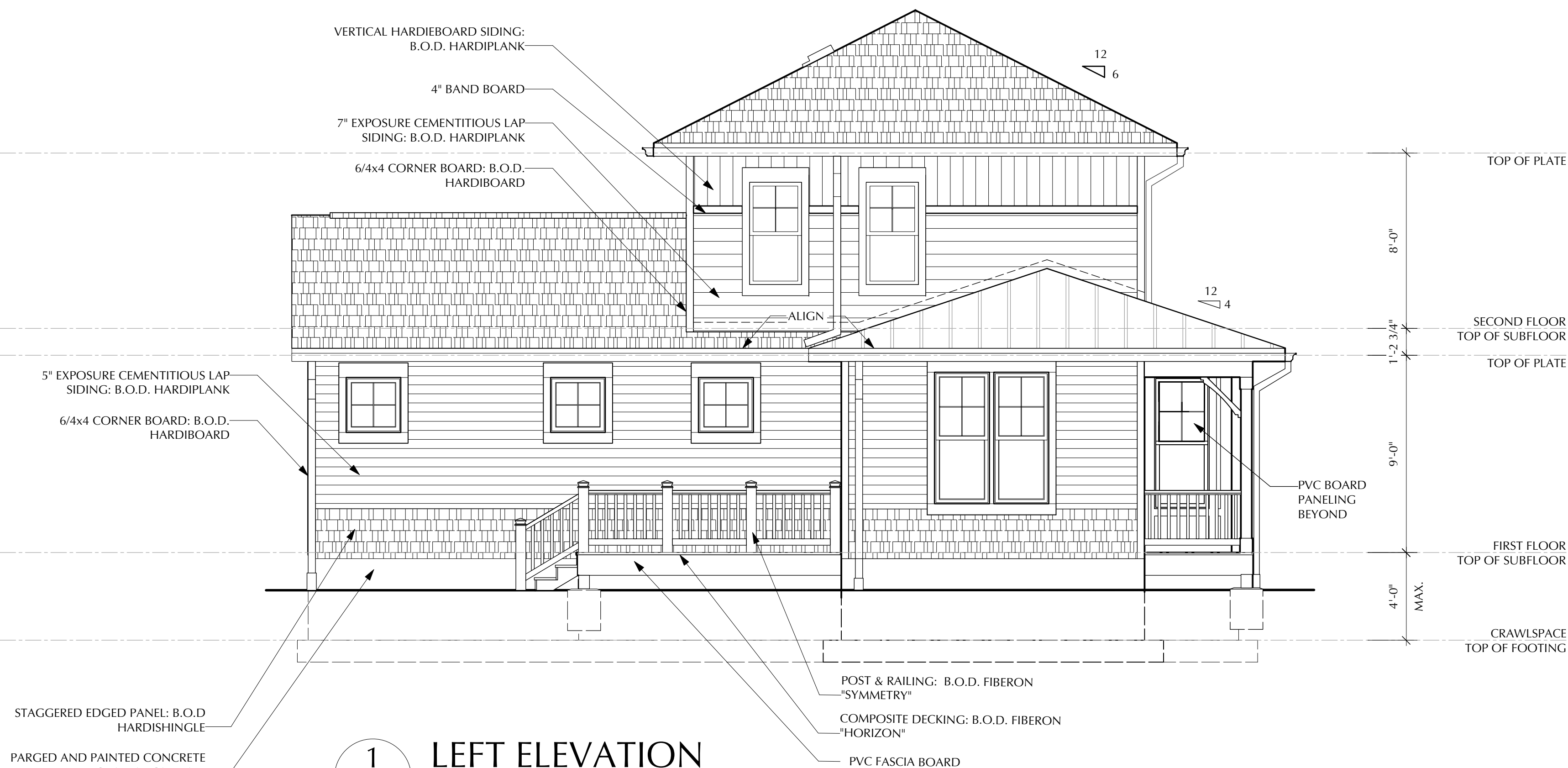
4 FRONT ELEVATION
A-200W Scale: 1/4" = 1'-0"



3 RIGHT ELEVATION
A-200W Scale: 1/4" = 1'-0"



2 REAR ELEVATION
A-200W Scale: 1/4" = 1'-0"



1 LEFT ELEVATION
A-200W Scale: 1/4" = 1'-0"